

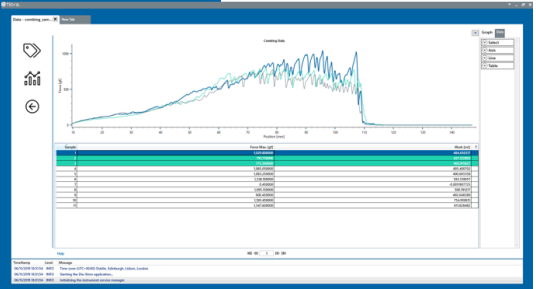


DIA-STRON
DELIVERING MEASUREMENT SOLUTIONS



fibra.one

All-in-one testing solution for hair tresses



Overview

fibra.one is a multi-functional tress testing instrument, with interchangeable accessories for combing, 3-point bend, and hair friction testing.

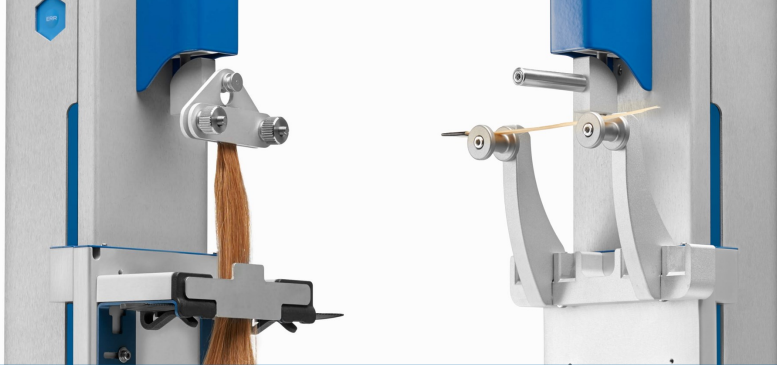
Measurements of hair tress properties can be used to develop new hair care ingredients and technologies, evaluate the technical performance of new formulations and support hair product claims.

Principal benefits:

- Intuitive icon-based software programme
- Quick-change accessories designed for an efficient workflow
- One instrument, multiple measurement options

Applications and claims:

- Ease of combing/conditioning claims
- Styling hold/flexibility claims
- Smoothness/surface damage claims



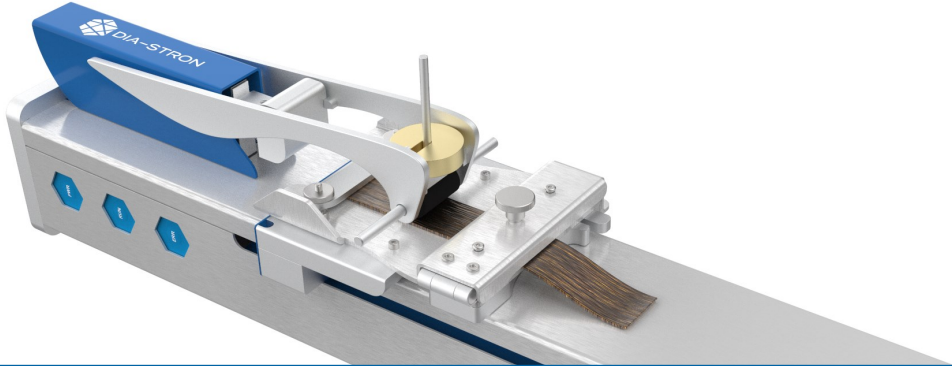
Combing —

The design of this accessory enables rapid tress mounting/dismounting (to change samples or re-wet samples during testing), flexibility for a range of comb sizes and thicknesses and a magnetic clamp plate to hold tresses within the comb during testing.

Combing measurements provide invaluable information about the conditioning performance of a product, and can be performed on both wet and dry tresses. Hair combing properties correlate well with consumer attributes e.g. “ease of combing”, “manageability” or “detangling”.

3-Point Bend —

This ergonomically designed accessory measures flexural properties of hair tresses, and is most commonly used for styling claims such as “hold”, “stiffness” or “feel” in the claims packages for styling polymers, hair gels and hair sprays. This can be used in the same vertical orientation as the combing accessory, reducing the time spent changing between accessories and testing methods.



Friction —

The friction accessory (used in the horizontal orientation) combines a rubber probe mimicking hand/skin compliance and texture properties, and a base plate with mechanism for secure and quick hair clamping. New design features include a detachable platen for rapid tress mounting/dismounting, simplified indexing of the probe position and an integrated auto-lift mechanism, removing the need for a compressed air supply.

Hair friction properties correlate well with consumer attributes such as “smoothness” or “surface damage” (heat, environmental, bleaching, repeated styling).

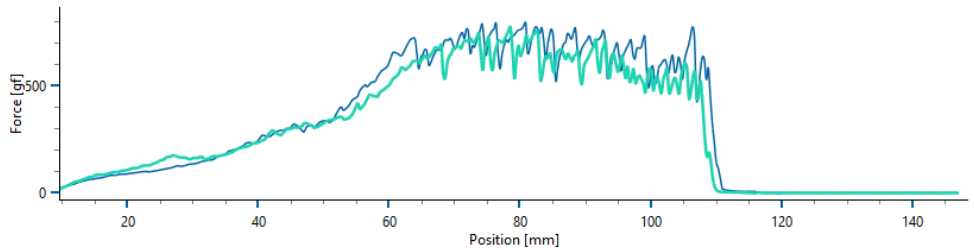
Dedicated software – fibra.

fibra.one is operated using Dia-Stron’s newest application software — fibra.

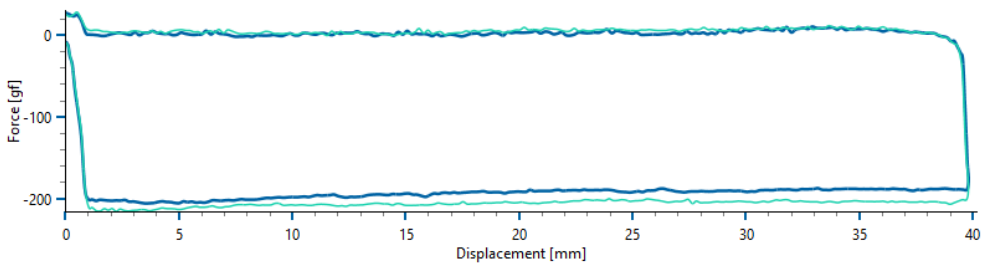
fibra.’s intuitive graphical interface is icon driven, making it uncluttered and easy to navigate. The parameters for each testing method can be easily edited within the software. fibra. is based on native scientific HDF5 format, offers a number of integrated data processing tools and raw data can be exported as a text file, for use in Excel or other statistical packages.

Sample data —

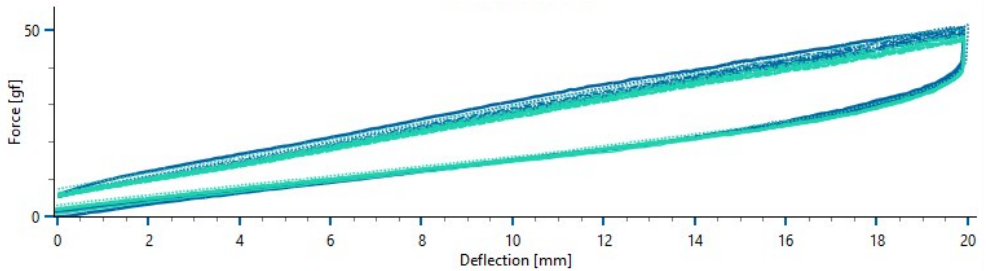
Combing Data



Friction Data



3-Point Bend Data





References —

Publications:

Gama R., Baby AR., Velasco MVR. (2017): "In Vitro Methodologies to Evaluate the Effects of Hair Care Products on Hair Fiber"; *Cosmetics Open Access Journal*, Vol. 4, Issue 1

Dario, MF., (2016): "Development and evaluation of the effectiveness of bioactive cationic nanoemulsion in protecting hair photo-oxidative damage"; Thesis (Ph.D.), Faculty of Pharmaceutical Sciences, University of Sao Paulo, 2016

Hartung C., Kortemeier U., Westerholt U. et al; (2013): "T-shaped Siloxane Microemulsion for Improved Hair Conditioning and Protection"; *Cosmetics & Toiletries magazine*, March 2013, Vol. 128, No. 3

Evans T.; (2011): "Evaluating Hair Conditioning with Instrumental Combing"; *Cosmetics & Toiletries magazine*, August 2011, Vol. 126, No. 8

Keenan AC, Antrim RF, Powell T (2011): "Characterization of hair styling formulations targeted to specific multicultural needs"; *Journal of Cosmetic Science*, 2011, 62(2):149-160.

Smith D., Morgen S., Johnson D. and St. Usaier R. (2000): "Enhancing Conditioner Substantivity"; *Soap & Cosmetics* 40-43.

McMullen R. L., Jchowicz J., and Keltry S. P. (2000): "Correlation of AFM/LFM with Combing Forces of Human Hair"; *IFSCC Magazine* 3, 39-43.



References —

Examples of use in patent claims:

US20180193242 Method for coloring or bleaching hair fibers (Friction accessory, Ashland LLC), Dec 2018

WO2017081698A1 Water-in-oil microemulsions for personal care (Combing accessory, Galaxy Surfactants Ltd.), May 2017

WO2016189276A1 Hair Care Formulation (Combing and Friction accessories, Croda International), Dec 2016

US20140234247 Aminofunctional Organosiloxanes (Combing accessory, Dow Corning), Aug 2014

US20120167401 Wet friction materials for hair removal devices (Friction accessory, Gillette), July 2012

Uses for claims in technology advertising:

- AkzoNobel
- Ashland
- BASF
- Evonik
- GHD
- Lubrizol
- Momentive
- Tri-K

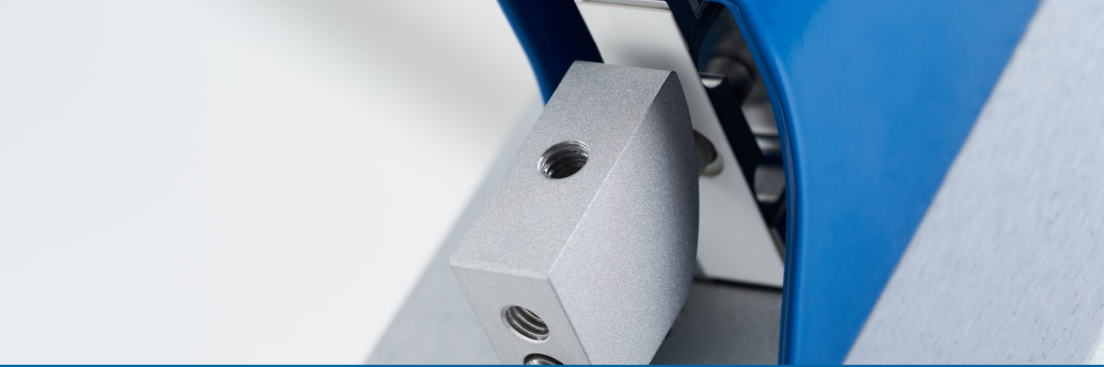


General Specifications

Operating temperature range	10 to 30°C
Operating humidity range	10-90% non-condensing
Environmental protection	IP31
Height	75cm
Weight	8kg
Footprint	25 x 25 cm
Power supply	Universal 85-265V AC, 47-63Hz
Power	Less than 50W
Compressed air	Not required

Drive system

Travel range	10 to 250 mm
Speed range	10 to 3000 mm/min (note 1)
Displacement resolution	0.5µm
Displacement accuracy	50µm



Force measurement system

Load cell	$\pm 20\text{N}$ (standard, note 2)
Force resolution	0.0005N
Force accuracy	$\pm 0.50\%$
Load cell non-linearity	$\pm 0.02\%$
Load cell non-repeatability	$\pm 0.02\%$
Methods	Extension and compression

Other requirements

Software	fibra. (x64 bit)
Operating system	Windows 7 or Windows 10 (Professional)
PC	1 x USB port
Communications	Ethernet network, static IP address

Notes:

1. Optional high-speed leadscrew option available to special order
2. Alternative load cell options 10N, 100N, available to special order
3. Specifications subject to change

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