Agence Nord:
ZA Object'Ifs Sud - Lot A3
6 Allée Emilie du Châtelet
14123 Ifs
tél : 02.31.34.50.74
fax : 02.31.34.55.17

Agence Est:
Parc Club des Tanneries
2 Rue de la Faisanderie
67380 Lingolsheim
tél : 03.88.04.01.81
fax : 03.68.93.01.52

Agence Sud:
Bât Le Venango. 392 Rue Jean Dausset
AGROPARC - BP11575
84916 Avignon Cédex 9
tél : 04.90.27.17.95 fax : 04.90.27.17.52

www.deltalabo.fr
info@deltalabo.fr

DCA – Surface Tensiometer

GIBERTINI

DCA- surface tensiometer

Automatic digital surface tensiometer

DCA

Superficial & interfacial tension, contact angle, and density measurement

GLP (Good Laboratory Practice) compliant

Compliant with official me thods such as:

ASTM D1331-20
ASTM D971-20

EN 14210:2003
EN 14370:2004

ISO 1409:2020
ISO 304:1998

IEC 62961:201810:23

MAIN FEATURES

- **Surface and interfacial** tension for liquids with **Wilhelmy** plate and **du Noüy** ring methods
- **Instantaneous display** of measurement values
- **Reading division:** 0.02 mN / 20µN (dyn/cm)
- **Measurement** range: 1-1000 mN/m
- **Resolution**: 10 µN/m
- **Contact angle**: 0-180°
- Maximum **capacity**: 110 g
- **Self-calibration** system

DCA: robust, easy to use, and cost-effective force tensiometers

SURFACE & INTERFACIAL TENSION

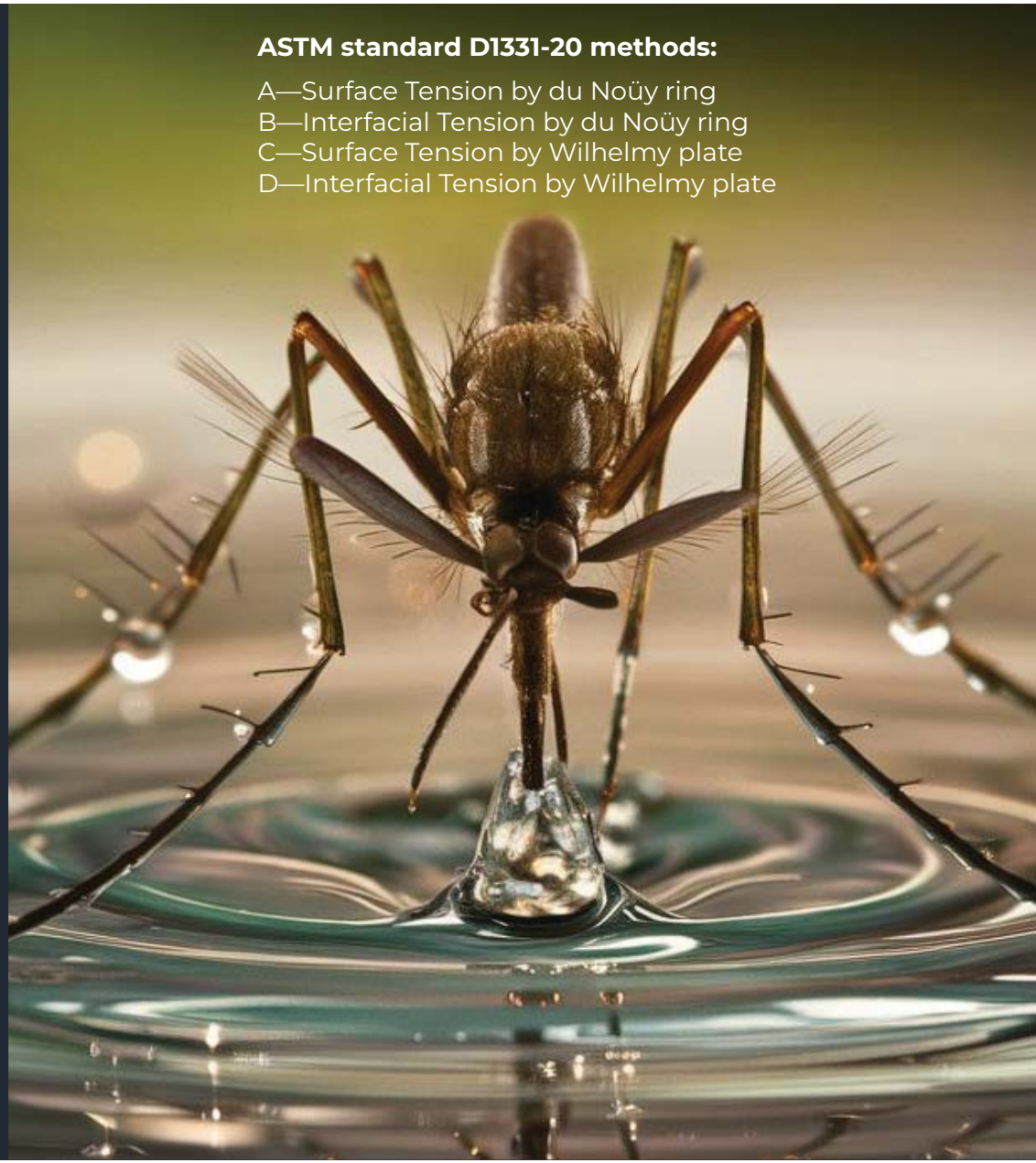
Surface tension is the force that acts on the surface of a liquid and tends to minimize its surface area. In contrast, **interfacial tension** is the force acting at the interface between two immiscible liquids.

Tensions are typically measured with a **force tensiometer**, in **mN/m** (milliNewtons per meter).

Wilhelmy plate and **du Noüy ring** are the most common official **methods** used to measure surface and interfacial tension.

The **Wilhelmy plate** is dipped into the sample. The force exerted by the liquid on the plate is measured to determine surface tension.

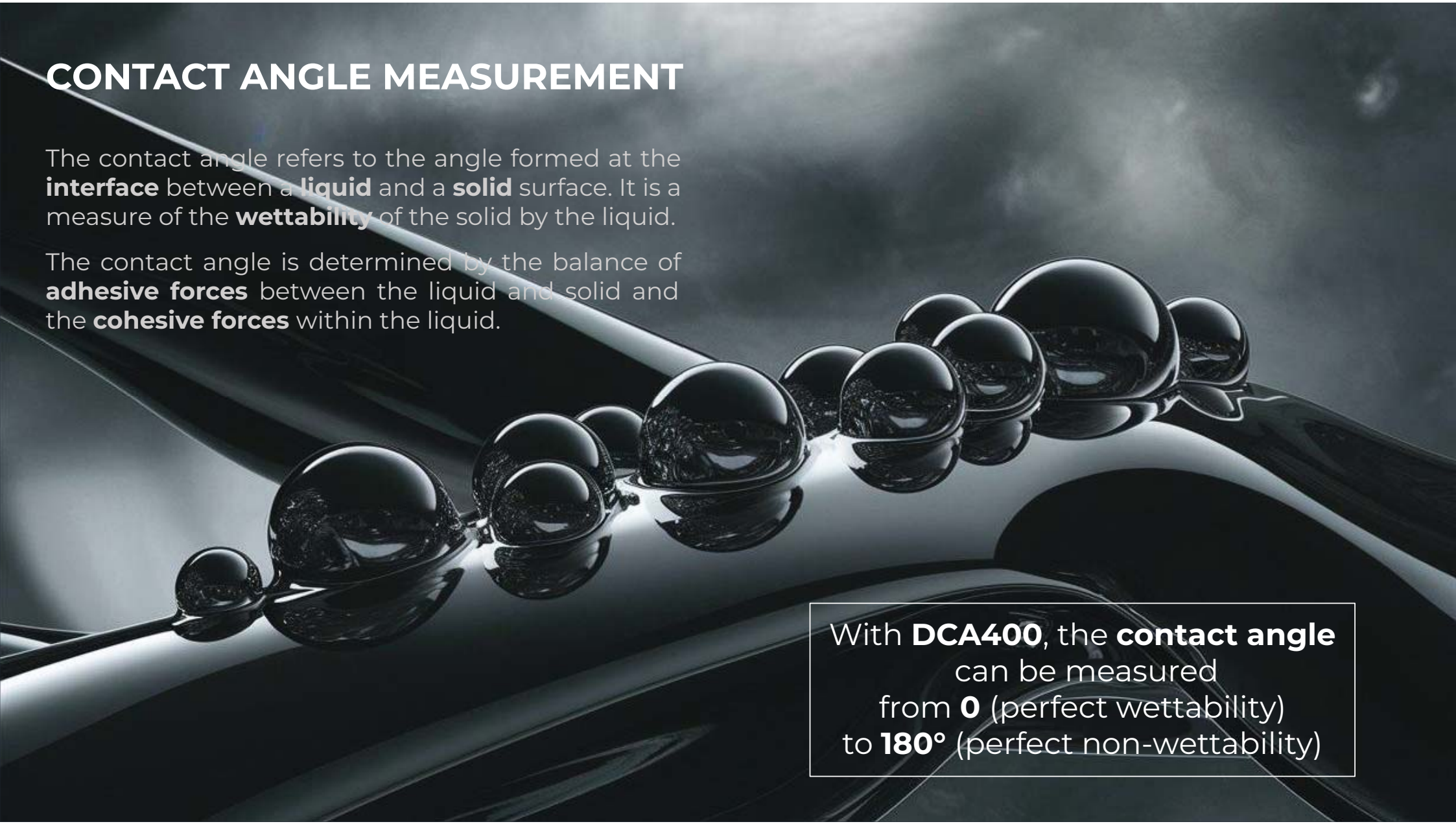
The **du Noüy ring** is pulled through the emulsion surface. The tensiometer measures the force required to **detach the ring** from the fluid surface.



CONTACT ANGLE MEASUREMENT

The contact angle refers to the angle formed at the **interface** between a **liquid** and a **solid** surface. It is a measure of the **wettability** of the solid by the liquid.

The contact angle is determined by the balance of **adhesive forces** between the liquid and solid and the **cohesive forces** within the liquid.



With **DCA400**, the **contact angle** can be measured from **0** (perfect wettability) to **180°** (perfect non-wettability)

DENSITY

Accurate density measurements are essential for identifying and **character-rizing materials**, making them essential for property analysis, quality control, and consistency in manufacturing processes.

They also play a crucial role in determining the correct **proportions of ingredients** used in formulations and blends across various industries.

Integrated measurements ensure that all parameters are determined under the **same conditions**, leading to more accurate and **consistent** results.

DCA: the **all-in-one solution** for surface + interfacial tension, contact angle, and density measurement

FIELDS OF APPLICATION - MATERIAL SCIENCE & RESEARCH

Petroleum/environmental engineering:
Force tensiometers are useful in processes like **oil recovery** and **wastewater treatment**, where measuring the interfacial tension between different fluids can be critical for process optimization.

Material / alternative energy research:
Accurate surface tension measurements aid in the development of **new materials** with desired properties, and optimization of **process reliability** and **safety** for energy and nuclear applications.

Automotive/aerospace:
Surface tension calculation for **fuels** and **lubricants** can be efficiently done using force tensiometers, especially in settings where robust and straight-forward evaluations are preferred.

DCA, accurate and consistent surface analyses, made easy

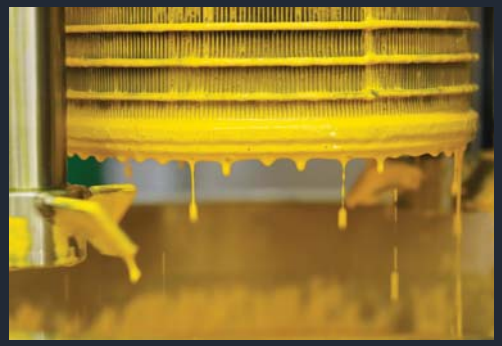
FIELDS OF APPLICATION – INDUSTRIAL APPLICATIONS

Coatings/paints/inks/sealants:
Surface tension measurement is used to ensure proper **spreading**, **wetting**, and bonding.

Textiles:
Regulating surface tension ensures uniform **fiber** processing and optimizes the application of **dyes and finishes**.

Cosmetics/pharmaceutical:
Optimizing surface tension improves emulsion **stability**, **spreadability**, and absorption, and increases drug **delivery efficiency** while ensuring **consistency** in product batches.

Food & beverage:
Evaluating surface tension increases the effectiveness of **surfactants** and **stabilizers** used in food processing.




DCA, accurate and consistent surface analyses, made easy

STANDARD EQUIPMENT

All DCA series instruments are supplied with:

- **Manual adjustable** (DCA) or **automatic** (DCA400) **lifting jack** with **programmable speed** from 0.004 to 21 mm/s
- **Temperature probe** PT 100 1/3 DIN:
  - measurable temperature range: 0 - 50°C
  - accuracy: 0.05°C
  - readability: 0.1° C
- Glass plates 24x24x0.15 mm
- Glass container for the liquid sample
- Suspension device for glass plate positioning

ACCESSORIES

- Platinum (DCA400) or glass (DCA) **Wilhelmy plate**
- Platinum **Du Noüy ring** (*)
- **Floater** calibrated in weight and volume at 20°C **+** double-wall **cylinder** for **density** measurement :
  - **density** measurement range: 0.5 ÷ 2.25 g/cm^3
  - readability: 0.00005 g/cm^3
  - precision and reproducibility: ± 0.00005 g/cm^3
- Specific container for sample thermostatation (temperature control)
- Special pan for metrological control(*)

TECHNICAL DATA

- Power supply: 100/240 VAC by external power supply, 50 Hz
- Consumption: 10 VA
- Max working temperature: 50°C
- Dimensions: 210x370x380 mm
- Weight: 8 kg

All DCA models can connect to a PC via the RS232 serial output to view analysis data.

(*): included (DCA400) / on request (DCA)

DCA, accurate and consistent surface analyses, made easy

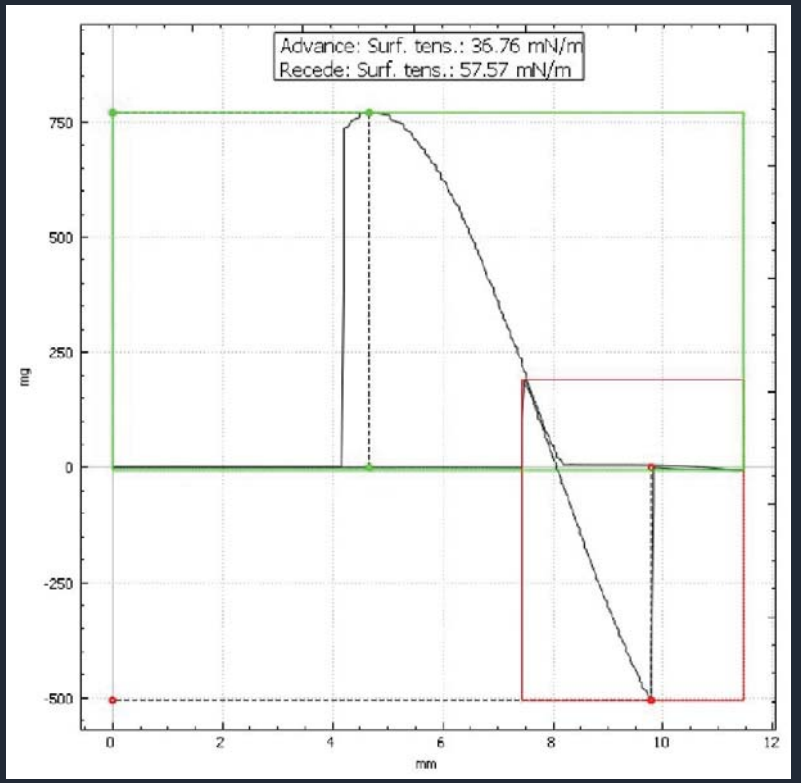
SOFTWARE (DCA400)

The software enables **dynamic** measurement of surface tension and displays **simultaneously**:

- **surface tension** values
- **force variations** (measured in dynes) recorded during the measurement
- elapsed **time**

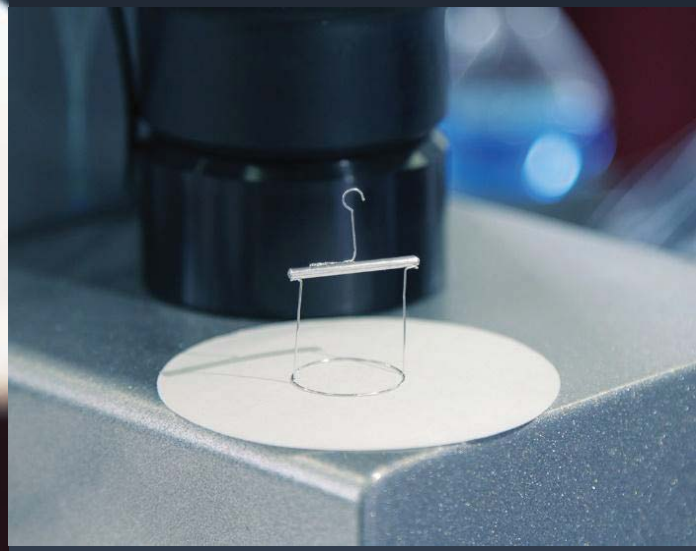
It allows also:

- **data storage** for further processing
- **lift jack control** (voltage, speed, and position)
- configuration of **plate perimeters** in various sizes beyond the standard dimensions
- selection of automatic or manual **'end of measurement'** systems



Example of surface tension measurement with du Noüy ring

DCA, accurate and consistent surface analyses, made easy



ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO

LAT N°094 RMP N°094

GLP (Good Laboratory Practice) compliant

Compliant with official me thods such as:

ASTM D1331-20
ASTM D971-20

EN 14210:2003
EN 14370:2004

ISO 1409:2020
ISO 304:1998

IEC 62961:201810:23

Technical specifications are subject to change without notice.
All our instruments are intended solely for scientific purposes and internal control.
They must not be used in environments with explosion hazards.
The use of our balances is prohibited in the circumstances outlined in Article 1, Point 2, Letter a) of Directive 2014/31/EU, except for models approved with the CE mark (legal metrology).
Electronic balances are sensitive to variations in gravitational acceleration and must be calibrated at the installation site (2014/31/EU).
All our instruments comply with Directive 2004/108/EU (electromagnetic compatibility).

GIBERTINI

www.gibertini.com

ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO
LAT N°094 RMP N°094