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1. GENERAL FEATURES – DCA

- Power source: 230 V -15% +10% by external power supply, 50 Hz
- Power consumption: 10 VA

1.1 DIGITAL TENSIO METER

- Display of surface tension value expressed in mN/m (dyne/cm) measured with the Wilhelmy method
- Precision: ± 0.02 mN/m (dyne/cm)
- Capacity: 1-1000 mN/m resolution 0.01 mN/m
- Max capacity: 110 g
- Autocalibration with internal mass
- Contact angle 0-180 degrees

1.2 EQUIPMENT

- Glass plates (dimensions 24x24x0.15 mm)
- Suspended system for the arrangement of glass plate
- Glass container for liquid sample
- manual adjustable lab jack
- thermometric probe Pt100 1/3 DIN; temperature range 0° to 50°C, accuracy $\pm 0,05^\circ\text{C}$, readability 0,1°C

1.3 ACCESSORIES ON REQUEST

- Platinum Wilhelmy plate
- Platinum Du Nouy ring
- Floater calibrated in weight and in volume and double wall cylinder for density measurement: - range of measure for the density: $0.5 \div 2.25$ g/cm³ - readability: 0,00005 g/cm³ - reproducibility: $\pm 0,00005$ g/cm³
- Specific container for sample thermostatisation
- Special pan for metrological control

2. INSTALLATION

DCA had been designed and manufactured to withstand and work even in severe environmental conditions.

Nevertheless it is advisable to install DCA as follows :

- **on a sturdy support free from vibrations**
- **in a place where the temperature is constant and free from excessive air draughts**
- **electrically connected to a preferential mains line**

Unlock the instrument by rotating the knob on the right side clockwise until the stop is reached (Fig. 1).



Fig. 1

Put on level with adjustable feet.

Picture of upper balance with bubble (fig. 2)



Fig. 2

3. DESCRIPTION

The DCA (Fig. 3) is a tensiometer that follows to have the static measure of the surface tension of liquid samples with the Wilhelmy plate method.

- 1 - Hang down
- 2 - Suspended system for arrangement of glass plate or ring
- 3 - Sample container
- 4 - Temperature probe
- 5 - Manual adjustable lab jack
- 6 - Locking device for transport



WARNING: the suspension must be free when the instrument is not in use to allows the automatic calibration.

4. OPERATING INSTRUCTIONS

4.1 GENERAL CONSIDERATIONS

The values of the parameters, surface tension, temperature, weight and volumic mass, are showed on display (common for DCA and DCA400 model) Fig. 4 - 5.

UNIT FOR CHANGING (g / mg)



Fig. 4



Fig. 5

KEYBOARD FUNCTIONS

Briefly press any key to follow on the covering function

Held down longer the "MENU" key to enable the configuration menu

5. LIQUIDS SURFACE TENSION MEASUREMENT

The DCA400 allows to have the static measure of the surface tension of liquid samples with the Wilhelmy plate method. Proceed as follows:

- place the plate in the support;
- clean the plate with the oxidizing flame of Bunsen burner
- wait the cooling of the plate;
- suspend the support with the plate on the hang down;
- place on the lab jack the container with the liquid in examination and lift it until the surface is close to the lower side of the plate (Fig. 6);

- press the **UNIT** key; till appear 0,00mN/m
- at this moment the tensiometer is ready to execute the measure:
- lift very slowly the sample and stop when the surface touches the lower side of the plate.

This moment is very visible because the liquid suddenly go up on the plate walls and then a meniscus is formed (Fig.7)

The value showed on the display is the surface tension of the sample.

At the end of the test, remove the support from the hangdown.



Fig. 6

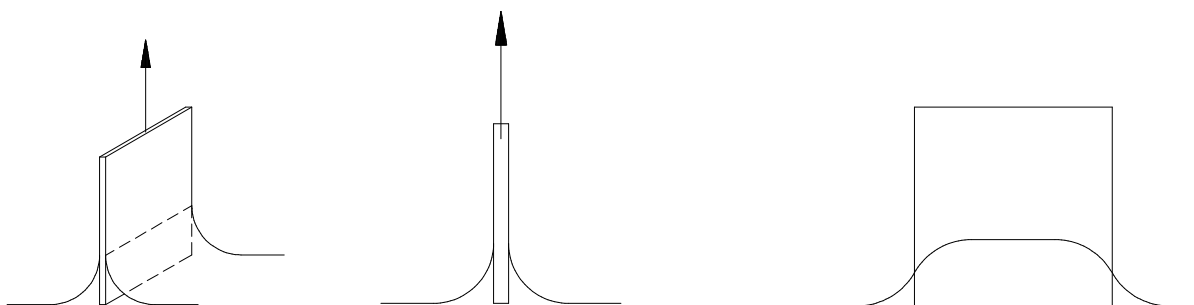


Fig. 7

6. SURFACE TENSION AND TEMPERATURE

Surface tension and temperature are inversely proportioned: when the temperature increases, the surface tension decreases. For example:

<i>Standard Liquids 100%</i>	<i>Surface tension</i>					
	<i>5°C</i>	<i>10°C</i>	<i>15°C</i>	<i>20°C</i>	<i>25°C</i>	<i>30°C</i>
Water	74.9	74.2	73.6	72.9	72.1	71.4
Ethanol	23.6	23.2	22.8	22.4	22.0	21.6
Heptane	21.6	21.1	20.6	20.1	19.7	19.2

It is advisable to know the temperature of the sample.

The thermo probe, must be plunged in the sample at the end of the test, to avoid contamination.

7. CLEANING

Glass plates and sample containers must be carefully cleaned.

The container can be cleaned with plasma or chromic mixture (better if warm).

8. MENU OPTION

SET UP PARAMETERS

➤ Serial port

- Baudrate
 - 38400
 - 19200
 - 9600
 - 4800
 - 2400
 - 1200
- Byte Format
 - 7-E-1
 - 7-O-1
 - 7-N-2
 - 7-E-2
 - 7-0-2
 - 8-N-1
 - 8-E-1
 - 8-O-1
 - 8-N-2
- Protocol
 - Crystal
 - Printer
 - Europe
- Transmit option
 - Request
 - Continue
- Stable Option
 - Stable mode OFF
 - Stable mode ON

➤ Calibration

- Calibration AUTO
- Calibration ON
- Calibration OFF

➤ Autozero

- Zero On
- Zero Off

➤ Filtering

- Slow Filtering
- Average filtering
- Fast filtering

➤ Idle Setting

- Idle on
- Idle off

➤ Set Default

- Exit without saving
- Store parameter & Exit

❖ External calibration

❖ Internal calibration

❖ Floater correction



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