

# 2830/2831

## Precision Oil & Solid Dielectric Analyzer Leaflet

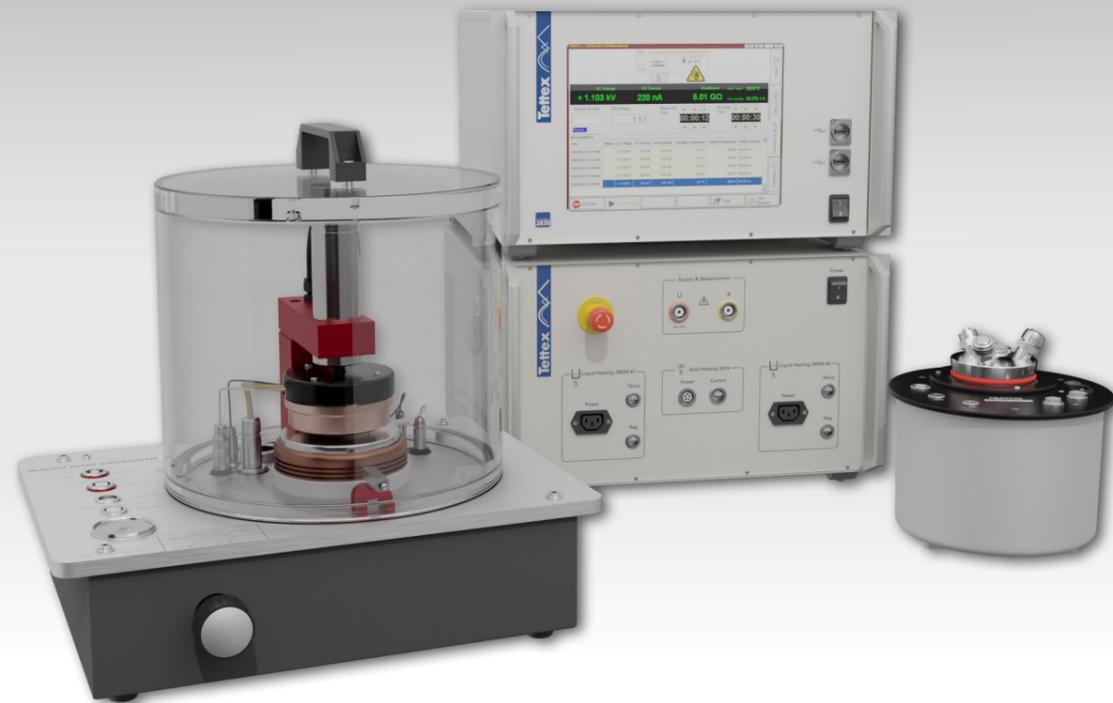


# HAEFELY

Current and voltage – our passion

Designed by

**Tettex**  
INSTRUMENTS



## HIGH PRECISION MEASUREMENT INSTRUMENT

The HAEFELY 2830/2831 is the result of extensive research and years of experience testing dielectric properties of liquid and solid insulating materials. It incorporates a fast and highly advanced procedure to measure capacitance,  $\tan \delta$ , resistivity  $\rho$  and relative permittivity  $\epsilon_r$  (dielectric constant) of liquid or solid insulating materials. A simple one-time-connection system together with resistivity measurement according to pre-selected standards drastically reduces measuring time.

The system consists of 2830, the measuring bridge and control unit, and 2831, the extension unit. This system is a complete replacement of the Tettex 2821 and 2822.

The 2830 contains the controller and the measurement part of the system.

The 2831 extension unit contains a standard capacitor, 2.5 kV AC & DC supplies and a temperature control unit.

## FEATURES

Capacitance,  $\tan \delta$ , resistivity  $\rho$  and relative permittivity  $\epsilon_r$  on liquid and solid insulating materials.

Large 12" touch display.

Customized programmable sequences and manual mode.

Integrated AC power supply 5 – 2500 V and 40 – 65 Hz.

Two independent integrated temperature control units.

Integrated ambient temperature and humidity sensor.

Place to connect two liquid test cell heater 2903 or one solid test cell 2914.

Existing Tettex test cells 2903 (from 1990 and later) and 2914 (from 1985 and later) can be used.

Data transfer over USB memory stick.

## ADVANTAGES

- Simple and one-time connection.
- Full graphical test visualization.
- Guaranteed test repeatability and additional flexibility.
- Adjustable control.
- Robust.
- Reliable measurement.
- Reduced testing time.
- Compatible.
- Convenient memory storage and test recall.

## APPLICATIONS

C and  $\tan \delta$  measurement and resistance measurement on liquid and solid insulating materials.

- Liquids like mineral, natural or synthetic oils
- Solid materials like insulation paper, silicone, rubber, polymeric plastics, etc.

The 2830/2831 is a valuable tool for factory tests, routine tests, R&D tests and regular maintenance.

## HIGHLIGHTS

- Faster
- Easier
- Existing Tettex test cell (2903 and 2914) are compatible
- Automated oil-test sequences according to standards (IEC, VDE, BS, ASTM)
- Manual mode with fully flexible test sequencer
- Integrated temperature and humidity sensor
- DC resistance measurement



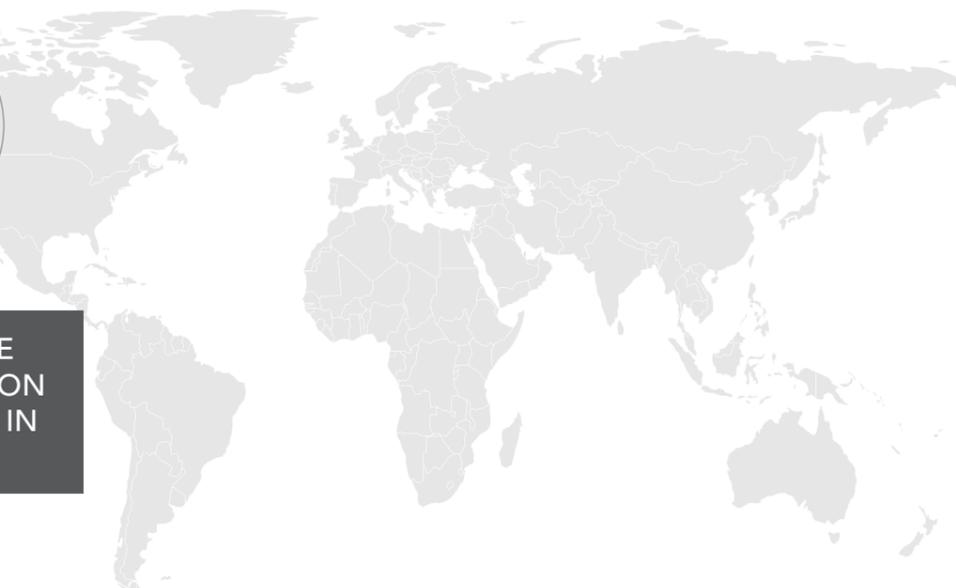
EXPERT'S CHOICE  
TO FULFILL  
INTERNATIONAL  
STANDARDS

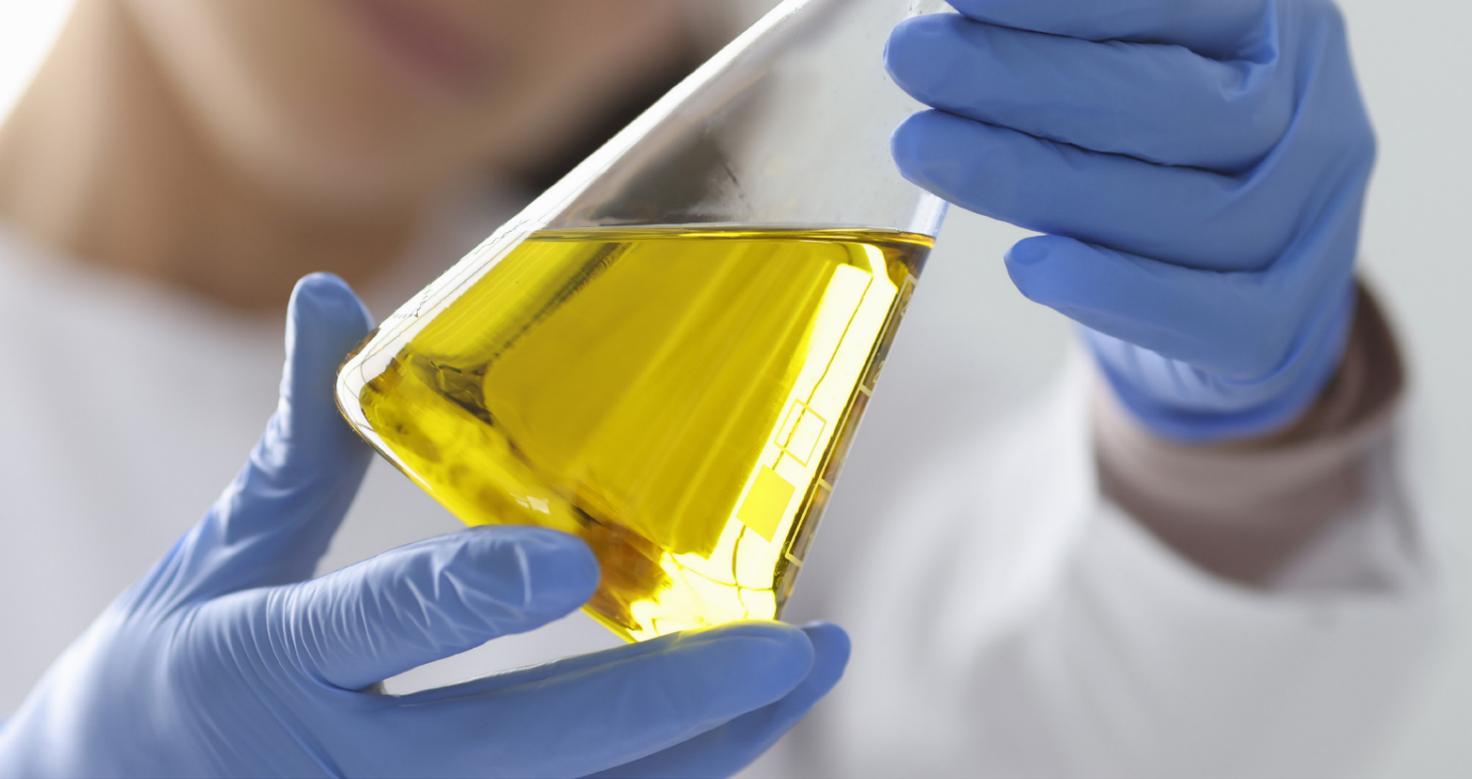


USED AS REFERENCE  
DEVICE IN MOST  
LABORATORIES



PROVIDING THE  
HIGHEST PRECISION  
AND ACCURACY IN  
THE MARKET





## LIQUID TEST APPLICATION WITH THE 2903

The precision test cell type 2903 measures the dielectric properties of liquid insulants such as insulating oil, and determines the dissipation factor  $\tan \delta$  and the relative permittivity (dielectric constant)  $\epsilon_r$  as well as the specific resistivity. The test cell has been designed as a cylindrical capacitor with a shielded measuring electrode (guard ring capacitor) and thus avoids partial capacitances, which might influence the test results. The design is in accordance with the specifications of IEC, ISO, and ASTM standards (USA).

The complete test cell type 2903 consists of the actual test cell type 2903a as well as the heating pot 2903h with built-in heating. The test cell 2903a consists of a cylindrical container (high-voltage electrode) with a shielded measuring electrode inside. The cell is vacuum-sealed by an O-ring. The measuring cell head includes a socket for the measuring electrode, two vacuum connections and analog thermometer.

The heating pot 2903h consists of the heating system, two temperature sensors, one thermometer for optical temperature indication and an additional heating stick.

To conduct measurements the test cell is inserted into the pot. The sockets for high voltage, the temperature controller and the temperature measuring bridge are mounted on the pot's top panel made of insulation material.

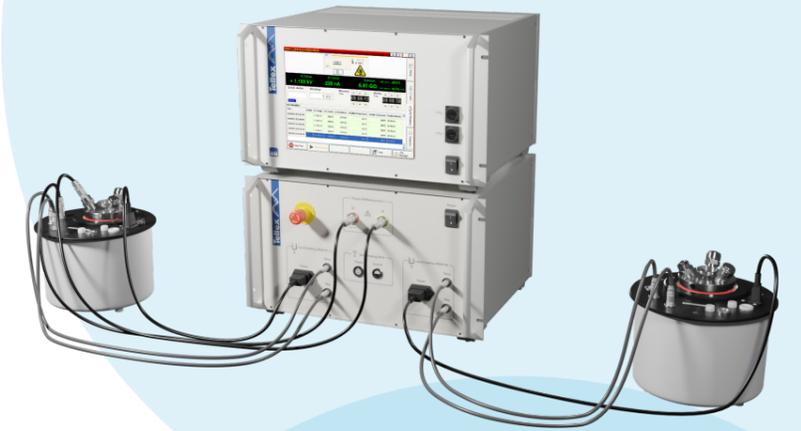
For most efficient dielectric measurement, the test cell is combined with a Tettex measuring bridge (type 2830) and a power supply with temperature regulator (type 2831). A test cell for solid insulating material is also available (type 2914).



Faster testing time with 2 simultaneous connections

High accuracy with 3-Electrode arrangement

Easy to clean, even for high-viscous liquids

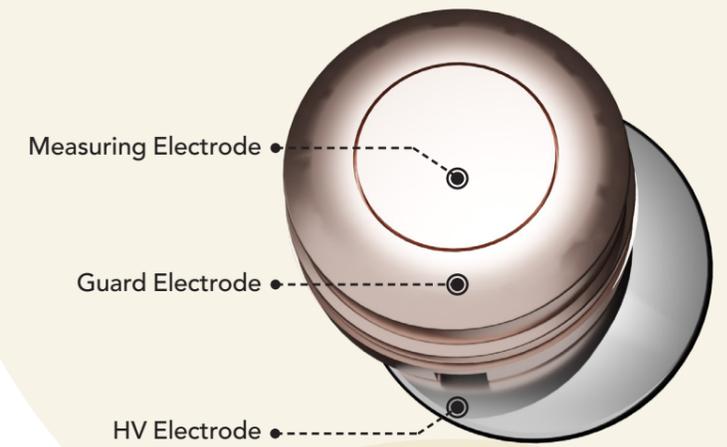


No fringe fields!





High accuracy with 3-Electrode arrangement



### SOLID TEST APPLICATION WITH THE 2914

The test cell is used for dielectric tests on solid test samples together with the measuring bridge 2830/2831. It determines dissipation factor  $\tan \delta$  and relative permittivity (dielectric constant)  $\epsilon_r$  on solid insulates such as paper and plastic foils, as well as specific resistivity. It is equipped with a shielded measuring electrode which eliminates stray capacitances that influence test results (guard ring).

A manual and external hydraulic system moves the upper electrode vertically. Once test object surface is reached, pressure between electrode and test object can also be increased. The embedded manometer indicates the specific pressure of the electrodes against the test object.

The electrodes are protected by a protective cover and can be vacuum and filled with protective gas through the available connections.

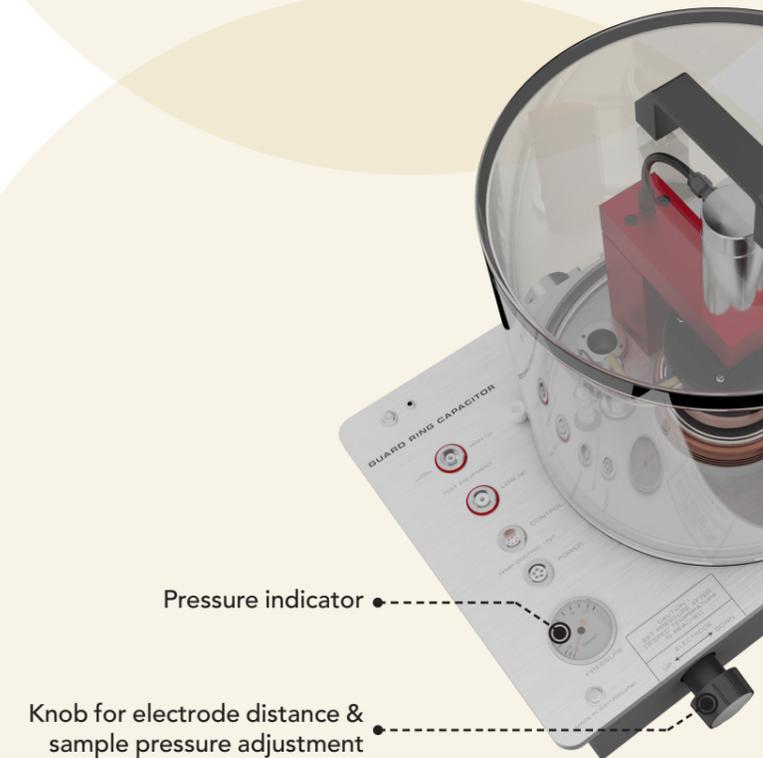
The test cell is equipped with a safety switch in the cover, ready to be connected to a Tettex power supply.

The base plate includes sockets for the measuring bridge, power supply as well as a temperature indication output.

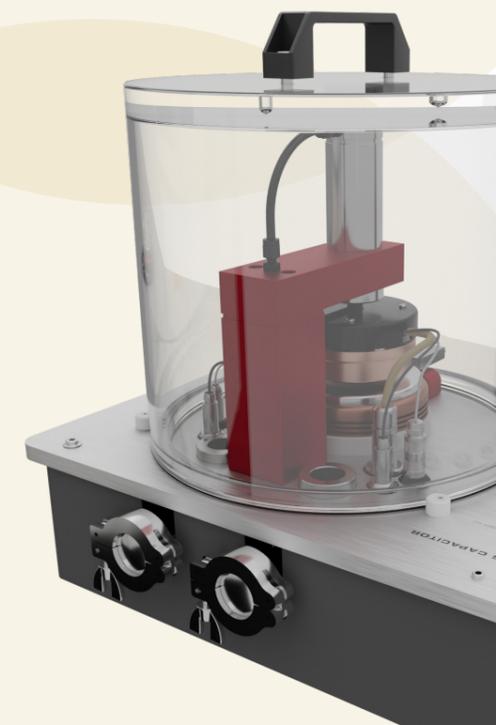
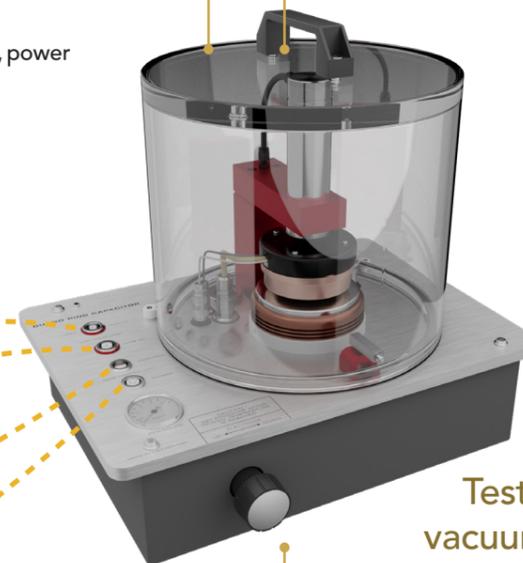
The design is the result of longstanding experience in the field of test cell building. It has been designed in accordance with ASTM (USA), IEC and ISO standards and conforms to recommendations of CIGRE.

The 2914 test cell consists of a shielded measuring plate electrode (with guard), and an insulated HV electrode mounted on the base plate, both electrodes can be heated.

Adjustable electrode distance and pressure

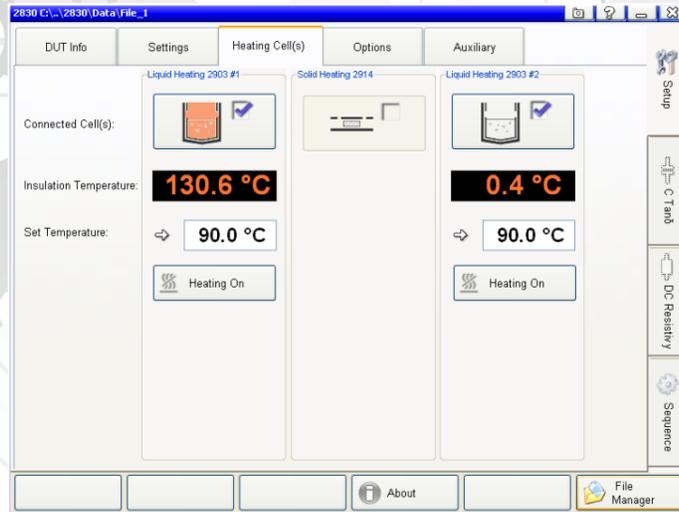


Test cell can be vacuum and filled with alternative gas





Configuration of the liquid and solid test cells with heating control.



Measurement parameters, recorded values, test cell parameters are all displayed in real-time.



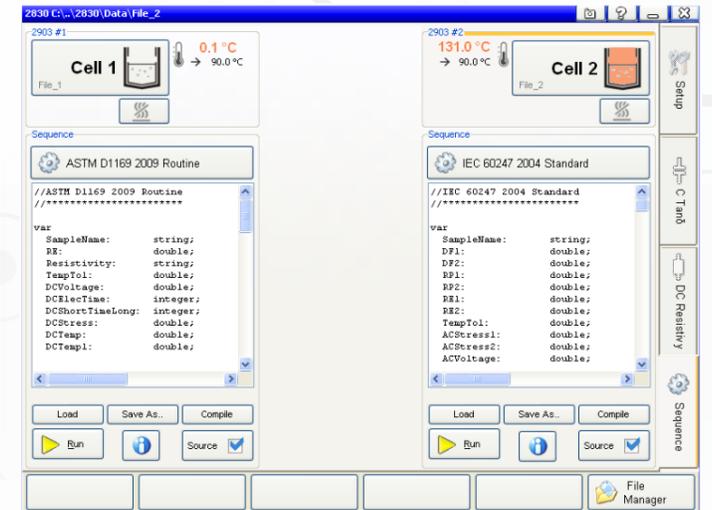
Adjustable settings window

Intuitive software interface for measurement

In-built sequences according to international standards



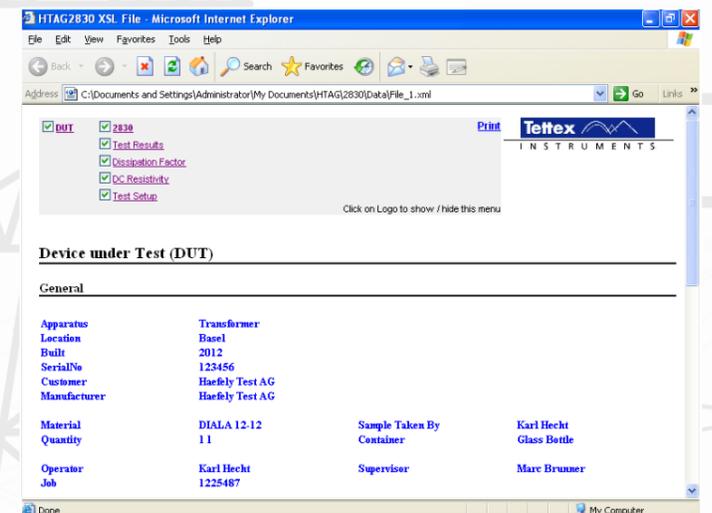
Possibility to load pre-defined sequences based on international standards such as IEC, ASTM and VDE.

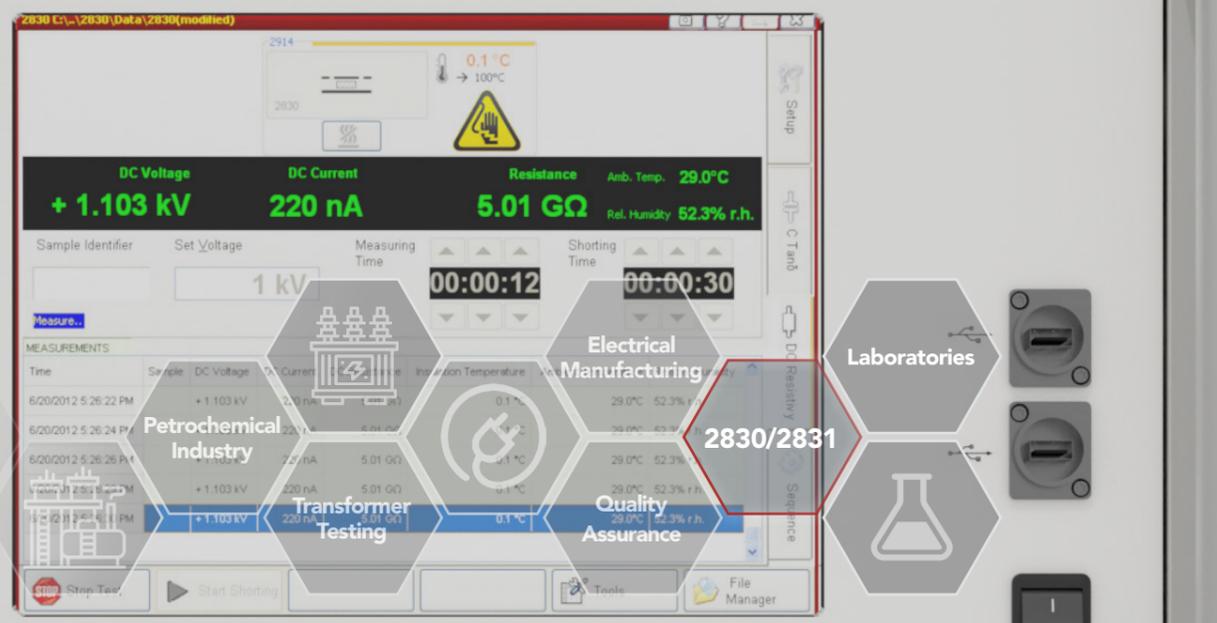


In-built Reporting Tool



Quick and easy reports with all measured values, screenshots and graphs.





### 2830/2831 BASIC SPECIFICATIONS

#### Capacitance Measurement

Test Current @ Input Cx, Cn	10 $\mu$ A ... 10 mA
Capacitance	$\geq 10$ pF
Dissipation Factor (tan $\delta$ )	0 ... 100

#### Resistance Measurement

Resistivity (Liquid)	900 k $\Omega$ m ... 27 T $\Omega$ m
Resistivity (Solid)	2.4 M $\Omega$ m ... 80 T $\Omega$ m

#### Relative Permittivity $\epsilon_r$

Relative Permittivity $\epsilon_r$	1 ... 30
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Complete technical specifications in the 2830/2831 datasheet, available on [www.haefely.com](http://www.haefely.com)



### STANDARD PACKAGE

1	2830/2831	3490084	2830/2831 Oil & Solid Dielectric Analyzer	2830/2831
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#### Including

- 2x LEMO cable 1 m
- USB cable 1 m
- Ethernet cable 1 m
- Earth cable
- Cable V common
- Mains cable 10 A
- Mains cable 16 A
- Interlock
- Memory stick USB
- Test certificate
- Instruction manual

### EXTENSIONS

2	Extended Warranty		
	2 years		2830
	3 years		2830

### ACCESSORIES

3	Solid test cell		
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Solid test cell for measurement of C, tan  $\delta$  and DC resistivity on solid dielectric samples. To be used together with the measuring instrument 2830/2831:

- Test cell
- Set of connecting cables (1x high voltage, 1x measuring, 1x temperature and 1x regulation)

2914

4	Liquid test cell & Heater		
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Liquid test cell for measurement of C, tan  $\delta$  and DC resistivity on liquid dielectric samples. To be used together with the measuring instrument 2830/2831:

- Test cell
- Set of connecting cables (1x high voltage, 1x measuring, 1x temperature and 1x regulation)
- Power cord
- Auxiliary heating rod

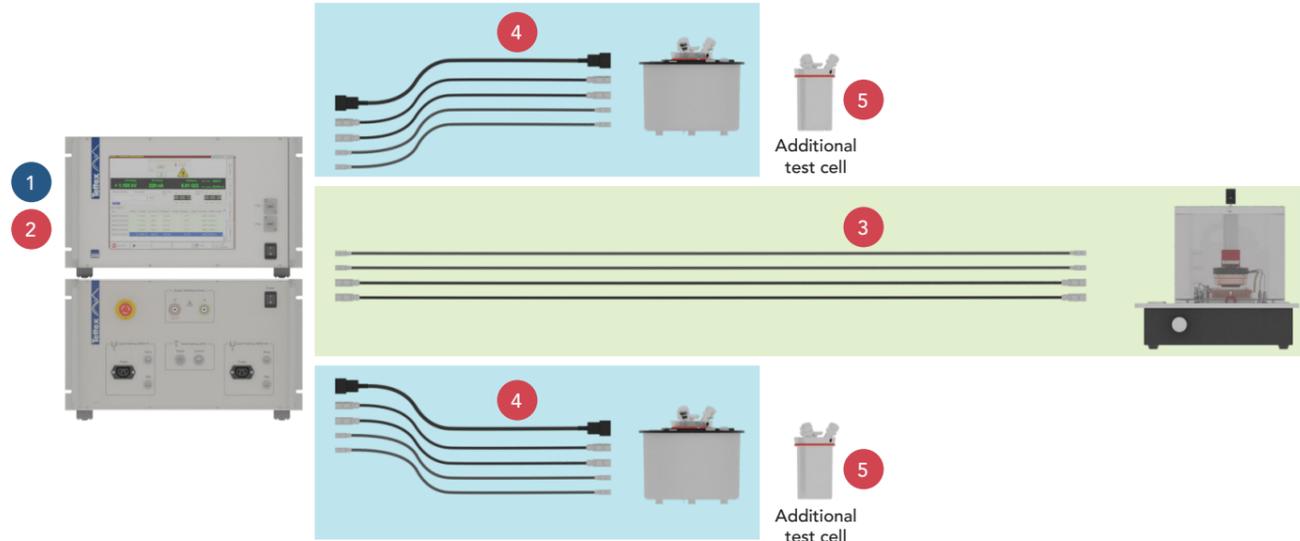
2903

5	Additional liquid test cell		
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Additional liquid test cell can be ordered for use with the heater 2903H and the measuring instrument 2830/2831 in order to reduce testing time.

2903A



### ADDED SERVICES



- Pre- & After Sales Support
- Application Support
- Commissioning
- Warranty Extension
- Calibration (accredited & factory)
- Training and Seminars



## Global Presence

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**HAEFELY**

Current and voltage – our passion

HV

HIGH VOLTAGE

IN

INSTRUMENT

EM

EMC

  
reliable.  
precision.