

For the Most Demanding cGLP/GMP Laboratories

The DDM 2911 Automatic Density Meter



Rudolph Research Analytical

29-Jan-2007 12:14:52

Density **1.09803** g/cm³

Measuring 3 of 5
Mean:1.0980; Min:1.0980; Max:1.0980; SD:0.0000

Specific Gravity **1.1000**

Mean:1.1000; Min:1.1000; Max:1.0000; SD:0.0000

Normality **6.0092** N

HCL % wt **19.95** %

Degrees Baume **12.94** °Be

Calibration Information

Air/Water 22-Jan-07
Water at 20 Deg C 23-Jan-07

Method Information

Method HCL
Sample ID 8421AZ
Lot No. 2011-B17J

Temperature (Deg C)

Set 20.00
Current 20.01

Start
Video

Automation

Menu Method Print Save Air Pump Rinse

Densitometry

Applications

The DDM 2911 Density Meter, with high precision Peltier temperature control of sample, has the features to meet the needs of today's industries.



PETROLEUM

- Measure API Values in accordance with ASTM D1250, ASTM D4052, ASTM D5002 and DIN 51757
- QC incoming raw materials
- Research new products and additives
- Withstands harsh and heavy use environments
- Calibrate using petroleum standards



CHEMICAL

- Measure in units of Kg/m³, g/cm³, g/ml, pounds/gallon, specific gravity, Baumé and more
- Determine concentrations in: %, molarity, normality, mole fraction, ppm, and more
- Check batch consistency and ensure proper blending ratios
- Wetted materials compatible with the most aggressive chemicals



PHARMACEUTICAL

- Capable of 2,3,4 or more multiple measurements with standard deviation, min and max reading for true cGLP/GMP compliance
- Complete IQ/OQ/PQ documentation
- Checking of raw materials and product release
- 21CFR11 Compliance; Electronic Signature and Secure Data Storage
- Compliant with USP 29<841>, JP, BP and EP



BEVERAGE

- Measure both alcoholic and non-alcoholic beverages with easy bubble detection using VideoView™
- Direct and accurate means of °Brix determination, °Plato, Extract, % Solids
- Use apparent density function for proper filling volume monitoring

Flexible Method Management

Factory installed measurement methods allow for immediate selection of the correct method to match the most common applications.

Method Name	Method Type
Density	Factory
HCL	Factory
Density/SG Viscosity Corrected	Factory
Density/SC Not Viscosity Corrected	Factory
Brix	Factory
AOAC Ethanol % by volume	Factory
AOAC Ethanol Proof	Factory
OIML Ethanol % by volume	Factory
OIML Ethanol % by weight	Factory
Crude Oil API Values	Factory
Fuel Oil API Values	Factory
Lubricant Oil API Values	Factory

For unique measurement applications, create a sample method using an unlimited number of Concentration Tables, Formulas, and Polynomials to match the measurement methods used in your laboratory. A few customized sample methods shown below:

- Concentration D₂O – Heavy Water
- Mole Fraction of Methanol
- Baumé of Hydrochloric Acid
- % HNO₃
- Normality of Sulfuric Acid
- Monomer Solutions
- Molecular Weight of Polymer
- Potassium Permanganate
- Drug to Propellant Ratio
- Hydrogen Peroxide
- Lead Content
- Molar Solutions of EDTA
- ppm Gold in Acid
- SG of Urine
- % Toluene in Heptane
- Sweeteners
- Fat in Lubricant
- Sodium Hydroxide

Setting up your custom method is as simple as filling out a few screens like the one below.

Method Settings

Measurement Mode: Multiple 5

Temperature: 20.00 Deg C Temp. Stability: 0.05

Use Predetermination: ☐ Criteria: Criteria 1

Error Timeout: 200 secs

Sample Filling: ☒ Manual ☐ Auto Sampler

Air Pump Switch off mode: ☐ Manual ☒ Timeout 60 secs

Pump terminates Measurement: ☒ No ☐ Yes

Sample ID Template:

Lot ID Template:

API Input: Density NC

Save Cancel

Full cGMP/GLP Compliance



Versatile Communication Capability

The DDM 2911's standard communication package includes:

- Ethernet Port for Network Cable Connection
- 3 USB ports
- 2 RS 232 ports

Allowing the capability to:

- Connect directly to Rudolph's service department for remote testing and diagnostics via Internet connection.
- Connect to any Windows® based printer via USB or direct to the server via Windows® Print Library
- Save measurement data direct to your Network/Server



cGMP/GLP Printing

Sample measurement reports are edited quickly and easily. Just import templates from Word® or Excel® to the DDM 2911 Density Meter and print your company's customized "C of A" directly.

Print your customized Certificate of Analysis including your company logo directly from the DDM 2911 touch screen

Rudolph Research Analytical
55 Newburg Road
Hackettstown, NJ 07840 USA



Date: 26-Jan-2007

This sample was measured on DDM 2911 serial number 20212, manufactured by Rudolph Research Analytical, Hackettstown, NJ, USA.

Lot ID 2019

Temperature: 20.0 Deg C

No	Sample ID	Density	Sp. Gravity	Normality	HCL % wt	° Baume	Time
1	8421	1.09803	1.1000	6.0092	19.95	12.94	14:20:50 PM
1	8421	1.09803	1.1000	6.0092	19.95	12.94	14:21:40 PM
1	8421	1.09803	1.1000	6.0092	19.95	12.94	14:22:30 PM
1	8421	1.09803	1.1000	6.0092	19.95	12.94	14:23:20 PM
1	8421	1.09803	1.1000	6.0092	19.95	12.94	14:24:10 PM

Counts : 5
Average : 1.0980
SD : 0.0000
Maximum : 1.0980
Minimum : 1.0980

Capable of making multiple measurements on a single sample and reporting complete statistical data and all measurement results

NIST Traceable Calibration Standards

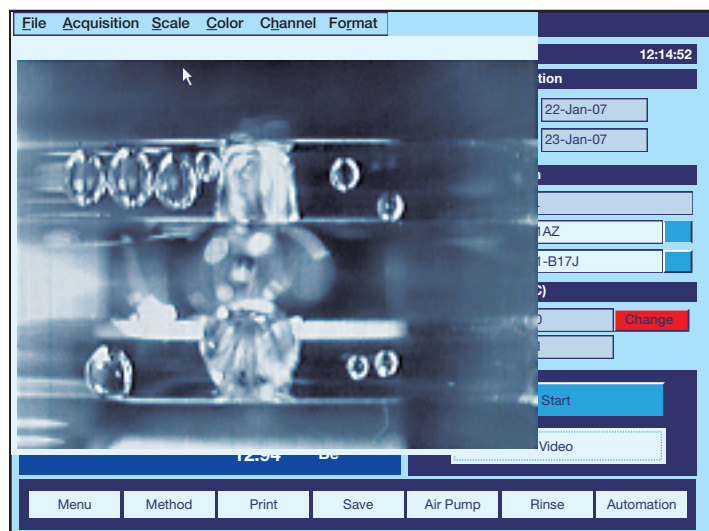
Rudolph knows how important it is to calibrate with NIST Traceable Standards and therefore, we include two NIST standards in the accessories provided with your density meter. The DDM 2911 standard accessories include:

- Quick Start Guide
- IQOQPQ Documentation
- Desiccant
- Luer Syringes
- Filling Nozzles
- Connecting Fittings & Tubing
- NIST Standards
- Manual

The Simplicity of Touch Screen Measure

VideoView™ Bubble Detection

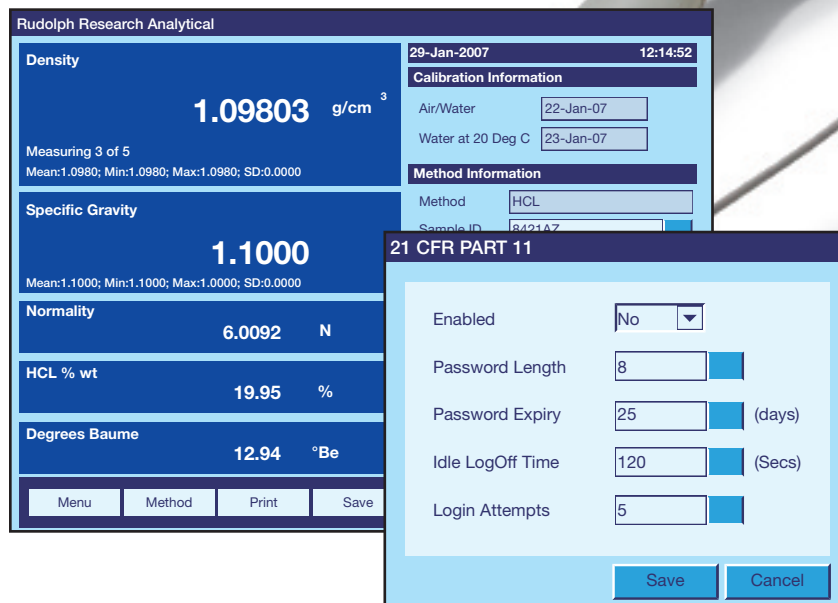
No more straining to see small difficult-to-detect air bubbles in your sample with live on-screen video viewing. On-screen bubble detection is made possible utilizing Rudolph's exclusive VideoView™ (patent pending) with 10X magnification.



Full 21CFR Part 11 Instrument Level Compliance

The DDM 2911's 21CFR Part 11 software module is easily enabled through the user friendly touch screen. This module gives you full compliance with:

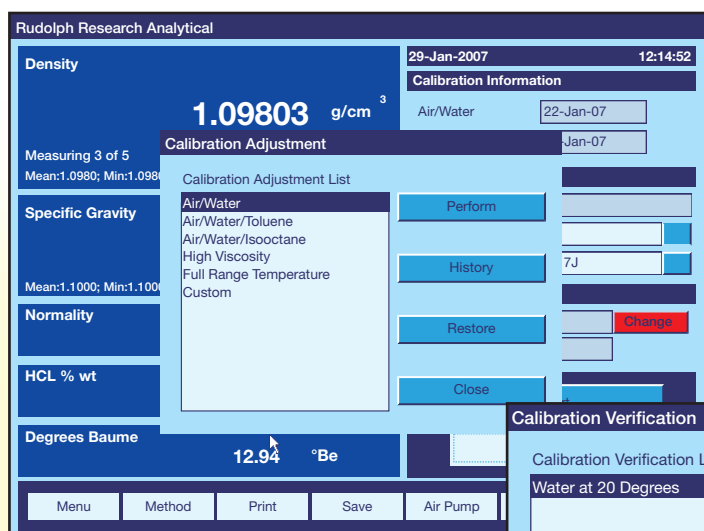
- Electronic signature
- Access levels
- Internal write protected storage
- Unique passwords
- Write protected documents sent directly to server



Oscillating U-Tube with V Correction and Reference C (patent pending)

The DDM 2911's oscillating U-tube with full correction and reference oscillator (patent pending) provides long term calibration stability and measures temperatures with a single calibration.

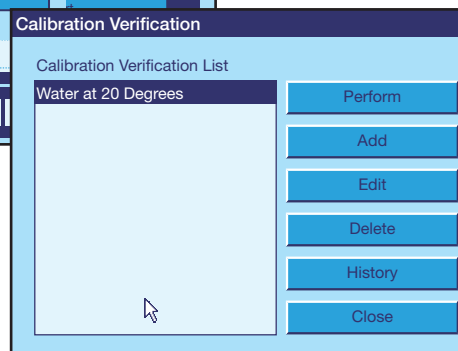
ment with the Flexibility of Windows®



- Unlimited number of customized calibration adjustments and calibration verifications possible.

cGMP/GLP Calibration

- Calibrate the DDM 2911 with 2, 3, or more NIST Traceable Standards – calibrating with merely air and water appears inconsistent with cGMP/GLP compliance regulations. (see H&D Fitzgerald's recommendations at www.density.co.uk)
- Can print out complete method configuration, communication settings, as well as calibration verification and calibration adjustment data/history.



- Measured values can be shown continuously as temperature stability is being reached or, at the discretion of the user, measured values will only be displayed once the final answer is reached and completely stable.

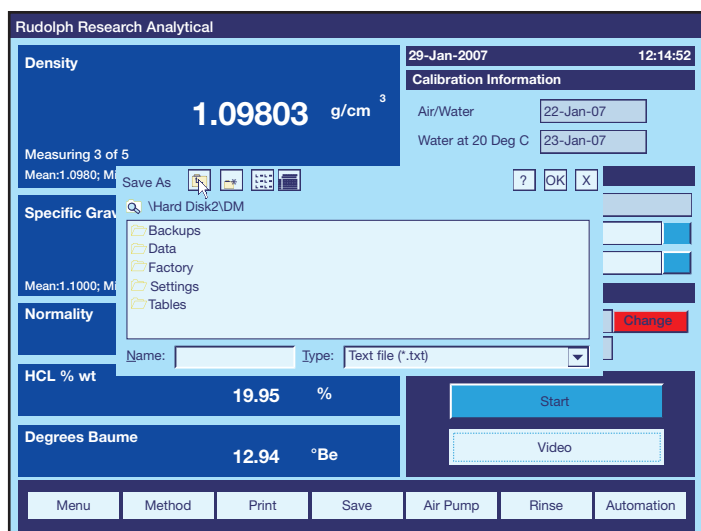


Viscosity Oscillator

Full range viscosity (pending) allows measurement at all rates.

Computer Windows Based Flexibility

- 2 gigabytes of internal memory allow almost unlimited capacity for saving measurement data. The DDM 2911 is network ready and data may also be saved directly to your server or to any directory desired.
- Internet access is possible directly from the DDM 2911's touch screen. This feature allows real time contact with Rudolph Research Analytical's Service and Technical Support Team who can access your instrument remotely to assist in Window navigation, method setup and trouble shooting.



- Windows based navigation architecture is so intuitive that most operators will never read the manual. But should you wish to reference the manual, it is stored right on the DDM 2911's internal memory.
- Copy methods, transfer concentration tables, download data, etc., via a USB port on front of unit.
- Three USB ports allow for quick and easy connection to a mouse, keyboard, printer, bar code scanner, or memory stick.

Automation Flexibility

- Rudolph's AutoSampler can be loaded with up to 240 samples
- Combine density and specific gravity measurements with a polarimeter, refractometer, and colorimeter for simultaneous measurements of:
 - Refractive Index
 - Color
 - Optical Rotation/Specific Rotation
- Up to three different rinse solvents available for use; fully programmable
- Two sample loading modes; pressurized and suction; for optimized sample transfer and measurement
- Customer's unique sample bottles may be used to eliminate the need to transfer samples into special sized test tubes.
- Emergency samples measured at any time without stopping the AutoSampler or moving sample vials.



Specifications of the DDM 2911

Measurement Ranges:	Density: 0 to 3 g/cm ³ Temperature: 0 °C to 90 °C (controlled via Peltier) Pressure: 0 to 10 bars	Display:	10.4 inch diagonal, 800-600 pixels, color, Flat Panel Monitor with Resistant Touch Screen Interface, 200 nits brightness, gasketed for spill protection
Measurement Modes:	Continuous, Single, Multiple	Communication Interface:	Touch Screen User Interface 3 – USB Ports 2 – RS232 Ports Ethernet Port for Network Connection Keyboard, Bar Code Scanner, Mouse, Network Capabilities
Measurement Technique:	Mechanical Oscillator Method	Video & Magnification:	Video assisted view of cell, capable of approximately 10X magnification
Accuracy:	Density: 0.00005 g/cm ³ Temperature: 0.03 °C	Internal Memory:	2 GB Non-removable Compact Flash
Repeatability:	Density: 0.00001 g/cm ³ Temperature: 0.01 °C	Shipping Dimensions:	36 in. (L) x 19 in. (W) x 18 in. (H) 91.44 cm (L) x 48.26 cm (W) x 45.72 cm (H)
Resolution:	Density: 0.00001 g/cm ³ Temperature: 0.01 °C	Shipping Weight:	70 lbs. (31.75 kg)
Minimum Sample Volume:	1 ml, approximately	Power Supply:	85 to 260 VAC; 48 to 62 Hz
Wetted Materials:	Borosilicate glass, Teflon (PTFE, ECTFE)	Power Consumption:	150 – 200 Watts

