

Density and Refractometry Excellence



Density Meters

D4, D5, D6

Refractometers

R4, R5, RX4, RX5

Performance Meets Simplicity
Accurate, Intuitive, and Modular

METTLER TOLEDO

One Solution, Multiple Analyses

Density and Refractometry Excellence

Developed for a wide range of applications, our intuitive Excellence Density Meters and Refractometers measure almost any sample with a very high accuracy. The modular design of the instruments allows your investment of today to be ready for the demands of tomorrow, adapting to your expanding workflow.



Density meters

Based on the oscillating U-tube principle, our digital density meters guarantee high reliability and maximum precision, with an accuracy of up to 6 digits in density. Measure density, specific gravity as well as many related values, such as % alcohol and Brix, quickly and reliably.



Refractometers

Brix, refractive index or concentrations of highly volatile, dark or viscous liquids: Our refractometers master quality control of a wide variety of challenging samples.



Combined density and refractometry

Density and refractive index are frequently determined for the same sample. Save time and optimize your workflow by measuring both parameters simultaneously: Simply connect a refractive index cell to your density meter and synchronize your measurements.



Each application/process has different demands. This is why we're offering different instruments to suit each purpose, accuracy and temperature range. View our entire offering on page 18.

Maximize Your Accuracy Trust Your Results

Having the latest in digital technology means achieving the most accurate results: the precise oscillating U-tube and total refraction technique, coupled with spot on Peltier temperature control, means you can trust your results every step of the way.



Measure at the right temperature

Precise temperature control right at your fingertips. Whether you need your samples at 15 °C, 20 °C, or even 90 °C, the Peltier thermostat maintains the measurement cell at a constant temperature, enabling highly accurate density and refractive index measurements.



Ensure reliable results

Sample the right way and ensure flawless density measurements with the integrated video view and automatic bubble detection. Viscosity correction ensures trustworthy results for density measurement of viscous samples.



Verify your instrument's performance

Regular calibration with certified and traceable standards ensures accurate measurements. Start verification immediately without the need to manually enter additional texts: simply scan in the barcode on the standard, and run the calibration.



The sky is the limit

Measure a variety of samples thanks to the wide measuring and temperature range, while ensuring an accuracy of up to six decimal places in density or five places in refractive index.

Keep It Simple

Focus on What You Need

Density and refractive index determination has never been so easy! With simple operating routines and an intuitive touch screen user interface, you can perform measurements quickly. Shared across different METTLER TOLEDO Analytical solutions, One Click™ gives easy access to the tasks you need, simplifying your daily work and making you feel right at home.



Start your task with One Click

Perform your analysis with just one click: Gain quick, simple and direct access to all routine tasks utilizing the shortcut buttons. Thanks to the instrument's user guidance, your measurement becomes as simple as it gets.



Customize your instrument

Tailor all instrument settings to your needs with personalized shortcuts and your selected operator language. The user management system allows you to define different levels of access and to protect critical data.



Follow the green light

One glance is all it takes to check the status of your instrument. The status light will show if the instrument is ready (green), busy (flashing), or waiting for operator interaction (orange).



One Click Quality Control Analysis

Minimize training and operator influence with One Click for fully automatic quality control analysis. Simply press on the product shortcut: measured products are automatically verified with the limits, and the color of the result indicates if specifications are met.

Increase Throughput Automate Your Workflow

Save time, reduce costs and improve operational safety by minimizing the need for operator interaction with the instrument. Increase the quality of your measurement data by automating your workflow: ensure that all steps are performed the same way each time. Increase results repeatability and reliability with fully automatic determination.



Automate your sampling

Fill and rinse the measuring cell with the SPR200 sampling pump. Utilize the DryPro drying pump for quick and efficient drying of your density meter.



Optimize sampling and cleaning

The powerful SC1 and SC30 autosamplers automate your workflow with up to 30 samples and – thanks to overpressure sampling – allow for the analyses of all types of samples, including high-viscous ones. Save time and rinsing solution with highly-efficient cleaning.



Measure demanding samples

Nothing is impossible: measure extremely viscous samples, as well as samples that are solid at room temperature with the SC1H and SC30H. Heated up to 80 °C, samples like bitumen or lipstick become fluid enough to be analyzed.



Run multiple samples

Load up to 303 samples on our autosamplers and press start: the system does all the work for you, whether for a single analysis or a multiparameter measurement.

The Perfect Solution Today

A Valuable Foundation Tomorrow

Save time and increase data quality. Multiparameter analyses combining density, refractive index, pH, titration, and more prevent the alteration of samples between individual analyses. Results can be displayed directly on the instrument screen, ensuring that all your data is directly at your fingertips.



Density and refractive index

Our space-saving system enables you to combine a density meter with a refractive index cell to measure both parameters in one go.



Refractive index and pH or conductivity

Combine a pH or conductivity meter with a density meter or a refractometer for multiparameter analysis, e.g. to measure acidity and Brix in fruit juice.



Acid-corrected Brix and more

Connect a refractometer to a titrator and determine the acid-corrected Brix value. Further instruments are supported with the auxiliary instrument function.



Color and more

Make the most out of your measurements. Combine simultaneous analyses of density, refractive index, pH and color using only 10 mL of sample. Sample recovery allows the sample to be retained in the vial as a reference for samples such as expensive flavors or fragrances.

Go Digital With LabX™ Software

Future-proof your lab. Much more than just an instrument management software, LabX manages data, instruments, and users and brings your tasks directly to the instrument's touch screen with bi-directional integration into your ELN, LIMS, or SAP system. Save paper, avoid transcription errors and ensure data integrity.



Manage your data

Manage methods and view results the way you want to see them. Store all data and metadata in real-time. Create customized reports to display the information you need.



Manage your instruments

Power your bench by integrating a variety of METTLER TOLEDO Excellence Line instruments on one multiparameter platform. Manage different instruments with one PC software that includes step-by-step user guidance and communication with LIMS and other lab systems.



Manage your users

Customize user roles and define user permissions and rights to protect your methods and data. Enable electronic signatures to sign off on measurements. Ensure secure user authentication with the use of password protection or fingerprint identification.



Ensure compliance

Be ready for audits with our software validation service, which ensures compliance of your LabX system with regulations such as 21 CFR Part 11, EU GMP, and ISO 17025.

Protect Your Investment

Trust Our Services

Keep your instruments measuring reliably and accurately. Ensure your daily routines remain efficient and produce high-quality products. We offer onsite service throughout the lifetime of your instrument to ensure maximum uptime and performance.



EQPac

The EQPac comprehensive qualification package fulfills your highest regulatory and documentation needs. With detailed IQ and OQ, PQ and MQ recommendations, initial calibration and basic user training, you can be confident of a perfect start with your new instrument.



IPac

The IPac standard qualification package for regulated industries confirms the correct installation and functioning of your instrument. The IQ and OQ confirmation, PQ and MQ recommendations, as well as basic user training ensure reliable results and correct operation right from the start.



Calibration

Make sure your instrument continues to work within specifications and meets your ongoing compliance requirements. Our calibration services use certified and traceable standards and provide a professional and easy-to-read certificate with measurement uncertainty for your audit.



Preventive maintenance

Unexpected downtime can significantly reduce your productivity and lead to high costs. Regular preventive maintenance provides the best care for your instrument, letting you plan your costs and minimize periods of expensive downtime.

Check your risk:

► www.mt.com/GDRP-riskcheck

What Else?

How Can We Help?

Your needs may evolve over time, and we want to support you every step of the way. Our application chemists continually develop application notes, videos, webinars, and more to help you use the full potential of your instrument.



Your main source of information

Access all main information on products, applications, white papers, hints & tips, webinars, and videos on our dedicated portals.

► www.density.com
 ► www.refractometry.com



Find your application

Search for applications in your industry to find how to best use your instrument. These proven and well-tested applications will help you to get accurate results quickly.

► www.mt.com/applications



Search for knowledge

Find catalogues, brochures, datasheets, user manuals, guides, handbooks, case studies, and much more in our Expertise Library.

► www.mt.com/library

Sampling

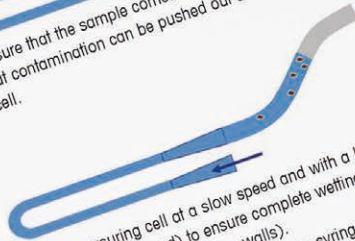
With a syringe Manual sample handling with a syringe is always operator-dependent, which means that it is error-prone, difficult to reproduce, and time-consuming. Make sure that your operator is properly trained and injects the sample in a reproducible manner.

 Use 3-component syringes with a rubber O-ring as they allow a much better speed control than cheap 2-component syringes.

Do NOT fill the cell just barely! Possible contamination would remain in the cell and yield a false measurement:



Make sure that the sample comes out of the cell at least an extra 10 cm, so that contamination can be pushed out and only new sample is left in the cell.



Fill the measuring cell at a slow speed and with a laminar flow (5–10 cm per second) to ensure complete wetting of the cell walls (no trapped bubbles along the walls). Make sure that no air is entrapped in the syringe. The plunger has to be pressed slowly and continuously without stopping.

Automatic filling Automatic filling systems ensure that the cell is filled with the correct speed and in a reproducible manner, independent of operators and samples.

With the METTLER TOLEDO SC1 and SC30 automation units it's even possible to fill very highly viscous or sticky samples into measuring cell (such as highly viscous oils, viscosity improvers, creams, molasses or liquid honey). The sampling speed can be easily adjusted for different sample viscosities in the defined products or methods.

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Knowledge is key

Gain a better understanding of your application and your instrument.

Increasing your expertise will allow you to make the most of your instrument.

Find the Right Instrument

Model Overview

Excellence Density Meters		D4	D5	D6
Density (g/cm ³)	Measuring range	0–3 g/cm ³		
	Accuracy	±0.0001 g/cm ³	±0.00005 g/cm ³	±0.000005 g/cm ³
	Repeatability	±0.00005	±0.000005	±0.000001
	Resolution	0.0001 g/cm ³	0.00001 g/cm ³	0.000001 g/cm ³
Temperature (°C)	Temperature range	0–95 (32–203 °F)		
	Accuracy	±0.03	±0.02	±0.01
Measurement scales	Integrated concentration tables and functions	Specific gravity, acid/base scales, chemicals, salt and others scales, Twaddell, light and heavy Baumé Alcohol: OIML, AOAC, Proof Degree, HM C&E, Gay Lussac Sugar: Plato, Brix (Emmerich, NBS 113), HFCS 42/55, Invert Sugar, KMW, Oechsle, Babo Petrol: API degrees and gravity tables for crude oils, refined products and lubricants Up to 30 user-defined concentration tables (can be entered as tables or formulas)		
Internal result storage		Maximum number of results: 200		
Integrated pressure sensor		Yes		
Viscosity correction		Yes		
Automatic bubble detection (BubbleCheck™)		Yes		
Color coded results identification		Yes		
User management		Yes		
Languages		EN, DE, FR, IT, ES, ZH, PT, RU, PL		
Display/User interface		7" display with color touch screen		
Dimensions (W x H x D) mm		267 x 226 x 256		
Weight		17.5 kg		



Excellence Refractometers		R4/RX4 ¹⁾	R5/RX5 ¹⁾
Refractive Index (nD)	Measuring range	1.32–1.70	1.32–1.58
	Accuracy	±0.0001	±0.00002 around adjustment point ±0.00004 entire range
	Repeatability	±0.00005	±0.00001
	Resolution	0.0001	0.00001
Brix (% w/w)	Measuring range	0–100	
	Accuracy	±0.05 ²⁾	±0.014
	Repeatability	±0.05	±0.01
Temperature (°C)	Temperature range	5–100 (41–212 °F)	5–75 (41–167 °F)
	Accuracy	±0.1	±0.03 (from 15 °C to 50 °C) ±0.05 (from 5 °C to 75 °C)
Measurement scales	Integrated concentration tables and functions	nD, Zeiss (14.45), Zeiss (15.00), acid/base scales, salt, chemicals, freezing point scales Sugar: Brix, HFCS 42/55, Invert Sugar, Oechsle Up to 30 user-defined concentration tables (can be entered as tables or formulas)	
Internal result storage		Maximum number of results: 200	
Color coded results identification		Yes	
User management		Yes	
Password protection		Yes	
Languages		EN, DE, FR, IT, ES, ZH, PT, RU, PL	
Display/User interface		7" display with color touch screen	
Dimensions (W x H x D) mm		208 x 193 x 226	
Weight		4.8 kg	



¹⁾ RX4 and RX5: Refractive index cells for multiparameter measurement, without terminal.

²⁾ 0.04 at 80% to 0.07 at 10%



Automation	D	R	Order Nr.
Drying pump – DryPro	•		30474899
Sampling pump – SPR200	•	•	30094285
SV3 3-way valve	•	•	30474898
SV3 SPR200 Bundle	•	•	30474907
InMotion Autosampler Flex	•	•	30094290
SC1 – Single Sample Automation	•	•	51326000
SC30 – Multiple Samples Automation	•	•	51327000
SC1H – Heated Single Sample Automation	•		51326400
SC30H – Heated Multiple Samples Automation	•		51327500



Multiparameter	D	R	Order Nr.
Connecting kit – Refractive Index Cell	•	•	51337024
Connecting kit – pH SevenCompact	•	•	51337023
Connecting kit – Conductivity SevenCompact	•	•	51337022
Connecting kit – Color Konica Minolta CM5/CR5	•	•	30025477
Connecting kit – Color Lovibond PFX-8xx/PFX-9xx	•	•	51337021
Connecting kit – Color Lovibond PFXI-195	•	•	30395922
Auxiliary instrument adapter ¹⁾	•	•	51105856

¹⁾ USB-RS232 adapter to control external instruments via RS232.

Accessories	D	R	Order Nr.
LabX PC software – Express	•	•	11153130
LabX PC software – Server	•	•	11153131
LabX PC software – Instrument license	•	•	11153250
Infrared motion sensor – ErgoSens™	•	•	11132601
Waste sensor – LevelSens™	•	•	51109853
Finger print reader – LogStraight™	•	•	51192107
Handheld barcode scanner	•	•	21901297
USB-P25 printer	•	•	11124301
P-56RUE printer	•	•	30094673
P-58RUE printer	•	•	30094674
Refractometer press for pasty products		•	51337155
Refractometer foil stamp set		•	30384986
Certified standard – Water	•	•	51338010
Certified standard – Dodecane	•	•	51338012
Certified standard – Dichlorotoluene	•	•	51338013
Certified standard – Bromonaphthalene	•	•	51338014



D: D4, D5 and D6 Density Meters

R: R4 and R5 Refractometers

No Matter the Task We Have the Right Solution



Handheld density meters and refractometers

Light, intuitive, and rugged, our portable instruments are designed to suit your needs in the lab and on the go. Make a quick check of incoming goods, control your processes and verify the quality of your final products.



Melting and Dropping Point

When it comes to the determination of melting, boiling, cloud, slip melting, dropping, and softening points, our Excellence Melting and Dropping Point Systems offer tailored solutions to suit your needs. No matter your application or industry, the instruments work with you every step of the way.



Titration

Precisely determine unknown concentrations with a wide range of titrators to suit your application needs. OneClick™ Titration ensures that your analyses can immediately be started, boosting efficiency and productivity. From manual titration to high throughput, and multiparameter systems, we have your application needs covered.



UV/VIS spectrophotometers

From simple quality control to strict pharmaceutical regulations, our UV/VIS Excellence spectrophotometers optimize spectroscopic workflows. FastTrack™ Technology makes for speedy and reliable measurements, and trustworthy performance is combined with intuitive and efficient One Click™ operation for a wide range of applications.

www.mt.com

For more information

METTLER TOLEDO Group

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