

Karl Fischer Titrators



Volumetric KF Titrators

DL31, DL38

Coulometric KF Titrators

DL32, DL39

Oven sample changer

Stromboli



Easy and reliable KF titrations

From 1 ppm to 100%

METTLER TOLEDO

Volumetric water content determination made easy: **METTLER TOLEDO DL38 & DL31**



The DL38 and DL31 volumetric Karl Fischer titrators have been designed for a wide range of water content applications – determinations from a few 100 ppm to 100% water, quickly and precisely. Compared to the routine DL31 titrator, the DL38 offers numerous additional features such as a method memory for fifty user methods, statistical functions as well as more sophisticated calculation possibilities. The DL38 is also ready-equipped for upgrade to a fully automated system.

Quick start

The Hello menu function gets you off to a quick start. Within a short time you have even performed your first analysis. The system guides you step by step through the setup, explains the different functions and starts your first titration.

Wide range of applications

The METTLER TOLEDO Karl Fischer titrators cover the entire range of water content determinations:

- water content determination in liquids
- water content determination in solids with external extraction/dissolution
- water content determination in solids with homogenization performed directly in the titration vessel, with appropriate accessories (DL38/DL31)

- water content determination through heating the sample (using a DO308 oven)
- bromine index and bromine number determination (DL38/DL39)

Expert guide

Even inexperienced users feel immediately at home with the straightforward easy-to-use operation of the instrument:

- a context-sensitive help function explains the various menu operations
- pictogram keys allow the quick and intuitive use of accessory functions.

A single keystroke

With the DL38 and DL39, you can start your three most frequently used titration methods with a single keystroke directly from the start-up screen.

Learn titration

The learn titration helps you optimize volumetric titrations with the DL38 and DL31. The titrators automatically determine the optimum parameters for the particular application.

Comprehensive documentation

The printouts from METTLER TOLEDO titrators present a complete overview of the experimental details including all the information required by GLP such as date, time, user, etc. – so that years later you can understand everything you did years before. The DL38 and DL39 can even print out the titration curves.

Coulometric water content determination made easy: **METTLER TOLEDO DL39 & DL32**

The DL39 and DL32 coulometric Karl Fischer titrators are ideal for water content determinations in the range of 1 ppm to 5%. The DL32 is optimized for simple routine analysis, while the DL39 offers additional possibilities such as statistical functions, a method memory for fifty user methods and more sophisticated calculation functions. The DL39 is also ready-equipped for upgrade to a fully automated system.



PC software included

Although the METTLER TOLEDO Karl Fischer titrators themselves are very powerful, connecting a personal computer further enhances their application possibilities. The LabX light titration software package is therefore supplied with the instrument. LabX light makes it easier for you to edit and manage methods and offers numerous possibilities for the reevaluation and statistical analysis of data.

Network capability and security

The optional LabX pro titration software allows you to manage all your titration data via a computer network. Methods and results are stored on a central server and

can be accessed by authorized persons via PCs on which LabX pro is installed. Besides this, LabX pro provides all the functions needed to comply with FDA 21 CFR part 11, such as electronic signature and audit trail. The User Manager allows you to manage access rights properly.

DL39 & DL32 coulometers: with or without diaphragm

The DL32 and DL39 titrators are available with two different coulometer cells – with or without a diaphragm. For most applications, we recommend the cell without the diaphragm because it is almost maintenance-free.

Due to its innovative design, this diaphragmless cell from METTLER TOLEDO can even be used for the determination of water in oils.

The version of the cell with a diaphragm is recommended for applications such as the determination of water in substances containing ketones. It is also recommended if the best possible accuracy is required.

Environmentally friendly

Due to optimized titration parameters, all METTLER TOLEDO Karl Fischer titrators can be used with ethanol-based Karl Fischer reagents.

Karl Fischer water content determination fully automated: **METTLER TOLEDO DL38/DL39 & Stromboli**



Titrate more efficiently

Titration with automatic titrators offers numerous advantages such as improved reproducibility of results and simplified working procedures. But to perform analyses really efficiently means that sample changing has to be automated. This then allows laboratory staff to concentrate on other important tasks while the titration samples are processed.

The combination of a DL38 or DL39 with the Stromboli Karl Fischer oven sample changer enables 13 samples to be titrated in unattended operation.

Plug and Play

Just connect Stromboli to the titrator using the cable supplied and switch on both instruments. You are now ready for your first measurement. Stromboli is controlled by the titrator. It does not have any operating elements and does not require special installation or configuration.

Easy sample handling

The 20 mL sample vials are designed for quick and easy handling: you simply add the sample, cover the vial with an adhesive foil and place a rubber seal on top.

Once the analysis is complete, you can easily remove the seal and reuse both seal and sample vial. You need no special tools and nothing is wasted.

Gas or air

The oven can be operated with a laboratory gas supply or with an optionally available air pump. The drying unit ensures that the gas entering the instrument is perfectly dry.

Clear display

Stromboli displays the actual and the preset oven temperature in large blue illuminated numerals on the top of the instrument.

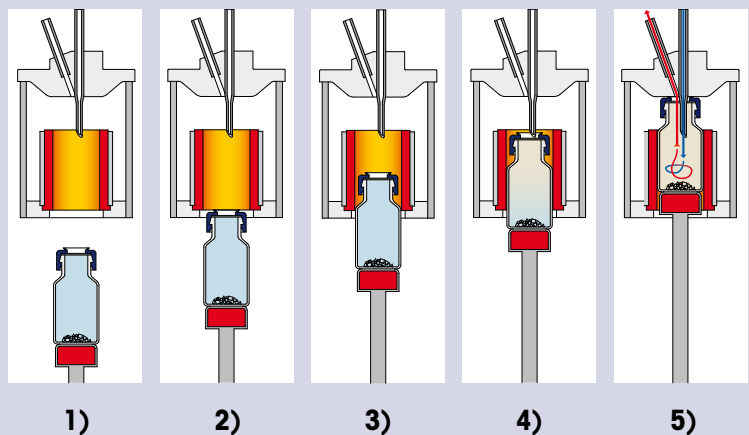


DL39 titrator with Stromboli, drying unit and optional air pump

Clever mechanism

The robust design of Stromboli's sample handling mechanism ensures trouble-free processing of samples and easy operation.

After the sealed glass vials containing your samples are placed on the turntable, the analysis series is started at the titrator (1). While the first sample vial moves into the oven, it is heated from the bottom by the heating plate inside the lift (2). Inside the preheated oven, the same vial is then heated on all sides (3). The foil between the rubber seal and the vial is pierced by the glass capillary (4). The water released by the sample is transferred to the titration vessel via the applied gas flow. The specially designed rubber seal ensures that no vapors can escape (5). After the titration, the sample vial is placed back onto the turntable. Stromboli turns one position further and the next sample is analyzed.



Karl Fischer titration system accessories

DL32/39 and DL31/38



D0308 oven
Water content determination through heating the sample



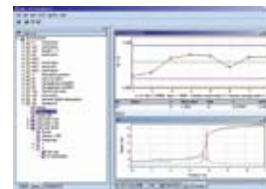
DM143-SC sensor
Indication of the titration



Laser printer
A4 or letter printouts



RS-P42 compact printer
Strip printouts



LabX® pro titration software
PC-based control of the titrator with various data management functions. The pro version additionally allows networking of many titrators, helps to become 21 CFR 11 compliant and has a more comprehensive feature set than the light version that comes standard.

DL31/38



Thermostatable vessel
Double-walled beaker with inlet/outlet. Allows titrations at non-ambient temperatures.



Homogenizer (DL38)
Homogenization directly in the titration vessel (TBox DR42 required).



Burettes with volumes of 1, 5, 10 or 20 mL
Select the burette optimal for your sample size

DL32/39



Coulometric cell with diaphragm
For samples containing ketones



Coulometric cell without diaphragm
Almost no maintenance needed

DL38/39 only



Stromboli
Automated Karl Fischer oven sample changer



TBox DR42
To be used with a DL38 and an homogenizer



Air pump for Stromboli
To be used instead of a laboratory gas supply

| Feature comparison and specifications | | Volumeter | | Coulometer | |
|---------------------------------------|---|-----------|----------|------------|------------|
| | | DL31 | DL38 | DL32 | DL39 |
| Application | Water content measurement range | >100 ppm | >100 ppm | 1 ppm – 5% | 1 ppm – 5% |
| | Solid, liquid and gaseous samples | ■ | ■ | ■ | ■ |
| | Bromine index and bromine number determination | | ■ | | ■ |
| | Can be automated with Stromboli | | ■ | | ■ |
| | Number of user methods | 1 | 50 | 1 | 50 |
| | Predefined Mettler methods | | 10 | | 5 |
| | Titrant memory/KF standard memory | 10/10 | 20+5/20 | | |
| Titration | Standby titration for automatic conditioning | ■ | ■ | ■ | ■ |
| | Drift stop for endpoint recognition (absolute and relative, tmax, delay) | ■ | ■ | ■ | ■ |
| | Autostart: automatic start after sample addition | | ■ | | ■ |
| | Drift determination | ■ | ■ | ■ | ■ |
| Evaluation | Number of results/calculations per method | 1 | 3 | 1 | 3 |
| | Calculation with external extraction/dissolution | | ■ | | ■ |
| | Statistics for up to 60 samples including tolerance range check, deletion of outliers | | ■ | | ■ |
| | Recalculation of results | | ■ | | ■ |
| | Printout of curves: V-t (C-t), E-t, Drift-t | | ■ | | ■ |
| Quality management | User list with alphanumeric identification | ■ | ■ | ■ | ■ |
| | Routine mode with limited user rights | | ■ | | ■ |
| | Titrator identification with alphanumeric ID and serial number | ■ | ■ | ■ | ■ |
| | Titrant data: batch number, expiry date, date of last concentration determination, concentration limits | ■ | ■ | | |
| | KF standards: batch number, water content | ■ | ■ | | |
| | Methods: name of the author, Date of the last modification | ■ | ■ | ■ | ■ |
| | GLP compliant documentation | ■ | ■ | ■ | ■ |
| Auxiliary functions | Burette: manual dosing, manual rinsing | ■ | ■ | | |
| | Pump: to dispense solvent | ■ | ■ | | |
| | Pump: to empty titration vessel | ■ | ■ | ■ | ■ |
| | Stirrer: manual on/off, stirrer speed in % | ■ | ■ | ■ | ■ |
| User interface | Hello menu tutorial function | ■ | ■ | ■ | ■ |
| | Context-sensitive help | ■ | ■ | ■ | ■ |
| | Guided method development | ■ | ■ | ■ | ■ |
| | Six languages: English, German, French, Spanish, Italian, Russian | ■ | ■ | ■ | ■ |
| Interfaces | Voltametric sensor input for DM143-SC double-pin platinum electrode | ■ | ■ | ■ | ■ |
| | Input for coulometric cell | | | ■ | ■ |
| | TTL-I/O control inputs/outputs | | ■ | | ■ |
| | Serial balance connection | ■ | ■ | ■ | ■ |
| | Serial computer connection | ■ | ■ | ■ | ■ |
| | RS-P42 printer connection | ■ | ■ | ■ | ■ |
| | Parallel printer connection (inkjet, matrix or laser printers) | ■ | ■ | ■ | ■ |
| Hardware | Volumetric titration stand with 150 ml glass beaker | ■ | ■ | | |
| | Coulometric titration stand with 200 ml glass beaker | | | ■ | ■ |
| | Coulometric glass cell with or without diaphragm | | | ■ | ■ |
| | Removable magnetic stirrer | ■ | ■ | ■ | ■ |
| | Integrated membrane pump | ■ | ■ | ■ | ■ |
| | Backlit graphic display | ■ | ■ | ■ | ■ |

Standard equipment of KF titrators and oven sample changer

DL38/31

- DL38/31 titrator with built-in burette drive
- Removeable DV1005 (5 ml) burette
- DM143-SC sensor
- Titration vessel with stoppers and tubing
- Magnetic stirrer with stirrer bar
- 2 brown glass bottles for titrant and waste
- 1 bottle of molecular sieve
- Tubing and small parts
- Instruction manual
- LabX® light software



DL39/32

- DL39/32 titrator
- Coulometric cell complete including generator electrode, with or without diaphragm
- DM143-SC sensor
- Magnetic stirrer with stirrer bar
- 1 brown glass bottles for waste
- 1 bottle of molecular sieve
- Small parts
- Instruction manual
- LabX® light software



Stromboli

- Stromboli oven sample changer
- 46 sample vials including caps
- 144 aluminium seals
- Drying unit
- Glass tube sets (normal and for oil)
- 2 aluminium inserts (for drift determination)
- Cable to titrator
- Tubing and small parts
- Instruction manual



Service and support

Feel secure in the knowledge that your KF titration system is installed and qualified according to the quality standards that apply in your company. Ask for one of the qualification products offered by your local METTLER TOLEDO representative in the form of service and accompanying documentation.



- Complete instrument qualification (DQ, IQ, OQ, PQ) including full documentation of the instrument's history
- Comprehensive calibration services

For further information see www.mt.com/ServiceXXL

www.mt.com

For more Information

Mettler-Toledo AG, Analytical,

CH-8603 Schwerzenbach, Switzerland
Phone +41-44-806 77 11
Fax +41-44-806 73 50
Internet: www.mt.com

Subject to technical changes
© 08/2006 Mettler-Toledo AG
Printed in Switzerland, ME-51724246C
Promotion & Documentation Analytical



Quality Certificate. Development, production and testing according to ISO9001.



Environmental management system according to ISO14001.



European conformity. The CE conformity mark provides you with the assurance that our products comply with the EU directives.