

Digital is better

What are the advantages of a digital burette?

Laboratory staff rely on electronic equipment for many processes. One of the most popular is an electronic pipette used as an alternative to the manual version. This article explores the many advantages of a digital burette over a classic glass burette.

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Source: Brand

1 A digital burette, such as the Titrette, facilitates titration of test solutions.



Colorimetric titration is a routine task in many laboratories, a technique typically taught during studies or training. Glass burettes are the traditional tool used in the process. Most titration procedures include the following steps:

- Clamping the glass burette in the corresponding receptacle
- Filling the burette with the titrating solution
- Titration of the test solution
- Reading the volume of the titration solution consumed
- Calculating the results

What appears at first glance as a smooth and simple test procedure, in reality, includes numerous potential sources of error. It begins with clamping the burette, a glass precision instrument, which requires great care for proper vertical alignment. The filling of the titrant is also performed manually, which means potential problems with the correct volume and also, depending on the type of the titrating solution, the safety of the user. Even the actual titration is not trivial, as the correct titration speed must be found: Not too fast, so that the equivalence point is not exceeded, but also not too slow, to prevent unnecessarily prolonging the titration period. If the user has mastered all these hurdles, the correct value of the consumed titrating solution must still be read and the corresponding calculations are made for the test. This pro-

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Bottle-top burette



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Table 1: Error limits of the system in comparison

Titrette versions		Titrette bottle-top burette				Bottle-top burette according to DIN EN ISO 86555-3				Glass burette Class A according to DIN EN ISO 385 and ASTM 287
Volumes [ml]	Partial volumes [ml]	Richtigkeit* [±%]	µl	Coefficient of variation* [±%]	µl	Accuracy* [±%]	µl	Coefficient of variation* [±%]	µl	Error limit** [±µl]
		10	10	0,10	10	0,05	5	0,3	30	
	5	0,20	10	0,10	5	0,6	30	0,2	10	20
	1	1,00	10	0,50	5	3	30	1	10	20
25	25	0,07	18	0,025	6	0,2	50	0,1	25	30
	12,5	0,14	18	0,05	6	0,4	50	0,2	25	30
	2,5	0,70	18	0,25	6	2	50	1	25	30
50	50	0,06	30	0,02	10	0,2	100	0,1	50	50
	25	0,12	30	0,04	10	0,4	100	0,2	50	50
	5	0,60	30	0,20	10	2	100	1	50	50

*Error limits related to the nominal volume printed on the device (= max. volumes) at the same temperature (20°C) of the device, environment and aqua dest. As well as regular, smooth handling.

** Error limit = accuracy + 2* coefficient of variation, according to DIN EN ISO 8655-6 Attachment B

cedure shows that there are numerous steps in a “simple” titration that can present the user with problems. How does an alternative appear?

Digital burette facilitates the process

Fortunately, the category of digital burettes have been established in the market (see Fig. 1), they offer an alternative to glass burettes and aid the user during titration. The Titrette® Bottle-top Burette is directly attached on a bottle filled with the titrating solution. Handling of titrating solutions, frequently hazardous to health, is omitted by this means, thereby increasing safety for the employee. Titrant is raised from the bottle using the wheels on both sides of the Titrette. The display is reset to zero with the “Clear” button and the titration is started. The standard solution is dispensed by rotating the hand wheels precisely into the sample. Using the “pause” button, the titration measurement can be stopped at any time and then restarted. An operating error is virtually excluded, since the burette automatically recognizes the direction of rotation of the hand wheels, and thus whether the burette is filling or titrating. Two micro-AAA batteries supply

power for a year in typical applications. The Titrette can be used with most common titration solutions (max. 1 mol/l), such as sodium hydroxide, hydrochloric acid or iodine-potassium iodide solution. Important for all users, who want to work within the error limits of the glass burettes Class A according to DIN EN ISO 385: The Titrette bottle-top burette has a newly developed measuring system, which facilitates the accuracy of Class A for glass burettes (see Tab.1). The volume is represented with three decimal places, and changes automatically to two decimals at volumes above 20ml.

Software minimizes calculation errors

Certain Titrette models can be connected to a PC for direct data transfer. Thus eliminating potential data transcription errors. All raw data is simultaneously collected. In each data transfer, the burette sends the titrated volume, the serial number of the device, the nominal volume, the calibration offset, as well as the next calibration date. Conclusion: Using a digital burette, minimizes many sources of error that exist in titrations with conventional glass burettes, and the user obtains secure results. ■