



## Application Note AN-T-102

# Standardization of hydrochloric acid with TRIS

## Correct titer improves the accuracy of results

Titriments are normally bought ready to use. However, the certified value is only valid at a defined temperature because the titrant density varies with temperature. With time and especially after opening the bottle of your titrant, the properties thereof will change because of evaporation of water and uptake of carbon dioxide. Due to these facts, it is necessary to determine the accurate concentration of your titrant solution on a regular basis using a primary standard. To correct the mentioned variation, a so-called «titer factor» is applied.

In case of hydrochloric acid as titrant, the primary standard to use is TRIS (Tris(hydroxymethyl)aminomethan). TRIS is inert, does not sublime, and reacts with hydrochloric acid according to a defined chemical reaction.

The titer can be easily and quickly assessed by using the Metrohm brand of autotitrators. Predefined calculation formulas implemented in Metrohm titrators or software, respectively, as well as the automatic storage of the titer factor, makes standardization a simple task.

## SAMPLE AND SAMPLE PREPARATION

High purity TRIS is used for the standardization of hydrochloric acid. TRIS is dried in a drying

oven for several hours and allowed to cool down to ambient temperature in a desiccator.

## EXPERIMENTAL

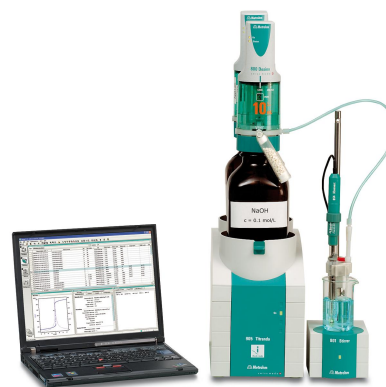
An appropriate amount of TRIS standard is added accurately to a beaker and dissolved with deionized water. The solution is titrated against hydrochloric acid until after the equivalence point is reached.

The sample size must be chosen according to the buret volume (equivalence point between 10–90% of buret volume).

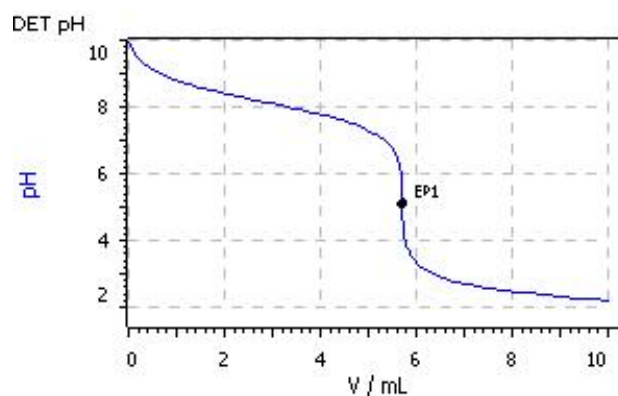
If a small cylinder unit (2 or 5 mL cylinder unit) is used for titration, it is recommended to make a stock solution and use an aliquot thereof for titration. This increases the accuracy for these burets.

## RESULTS

A six-fold determination exhibited a mean titer value of 1.0069 with an absolute standard deviation of 0.0037 and a relative standard deviation of 0.37%.



**Figure 1.** 905 Titrando with tiamo. Example setup for the titer determination of hydrochloric acid.



**Figure 2.** Example curve of a titer determination of hydrochloric acid with TRIS as primary standard.

## CONCLUSION

The determination of the titer of hydrochloric acid is performed both quickly and reproducibly. Easy, fast, and precise titer determination using Metrohm autotitrators results in reliable titration analyses. Predefined calculation formulas

implemented in these titrators or software, respectively, as well as the automatic storage of the titer factor makes standardization a simple task.

## CONTACT

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## CONFIGURATION



### 905 Titrande

用于使用 Dosino 加液系统一个量接口位分析滴定的高端滴定。

- 多四套 800 Dosino 加液系
- 等当点滴定(DET)、等量等当点滴定(MET)和点定滴定(SET)
- 使用子性量(MEAS CONC)
- 控的加液功能,LQH
- 用于外拌器或加液器系的四个 MSB 接口
- 智能“iTrode”
- USB 接口
- 使用 OMNIS-Software、*tiamo*-件或 Touch Control
- 如果需要,足 GMP/GLP 和 FDA 要求,比如 21 CFR 第 11 部分



### Unitrode

用于 pH 滴定的合 pH。它特用于:

- 在的、粘性或性品中行 pH 滴定
- 温度升高的候

固定磨口隔膜染不敏感。

参比:c(KCl) = 3 mol / L,存在存溶中。

替代方法:T>80° C 的滴定用参比解,存在 Idrolyt 中

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