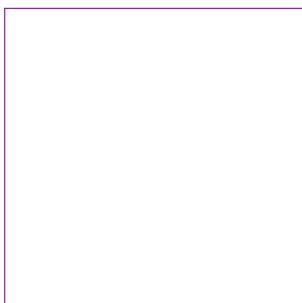
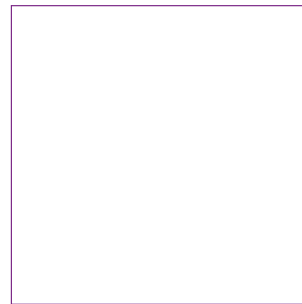
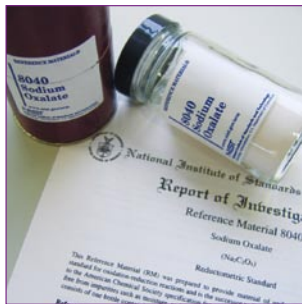
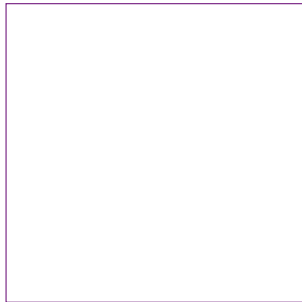
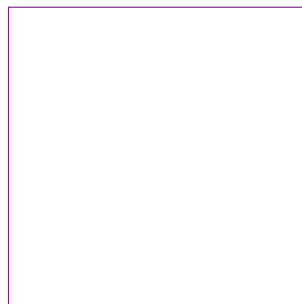


Scharlau

The wise choice



Titrasure[®] standards and volumetric solutions
...for guaranteed results

Titration is a high-precision analytical method that requires titrants of accurately known concentration. Scharlau's volumetric solutions are manufactured with utmost precision, allowing us to guarantee a factor of 1.000.

Potentiometric titration

Our Quality Control laboratory uses automatic titrators and potentiometric methods to detect the titration endpoint. Potentiometric detection is much more reproducible than traditional colorimetric visualisation and eliminates the errors associated with the visual perception of each individual. The use of potentiometric methods allows us to achieve a precision of 1/1.000th in the factor, something not possible with traditional titration methods that use colour indicators.

The relative error due to resolution of a 25 ml glass burette is 20 times higher than the error of an automatic titrator. An example of how this can influence the titration result is shown below.



Titrasure® 0,1 M sodium hydroxide titration with potassium biphthalate

The titration curve shows how pH varies as small volumes of sodium hydroxide are added to a potassium biphthalate solution. The pH ranges over which three of the most widely used colour indicators turn are also shown.

The titration endpoint is reached after 22,035 ml NaOH have been added.

What would happen if the same titration were done with a visual indicator and a 25ml glass burette?

In this case, we can only measure accurately the volume of one drop of NaOH (0,05 ml). Figure 2 shows that the error associated with the burette would lead to a considerable difference in the titration endpoint.

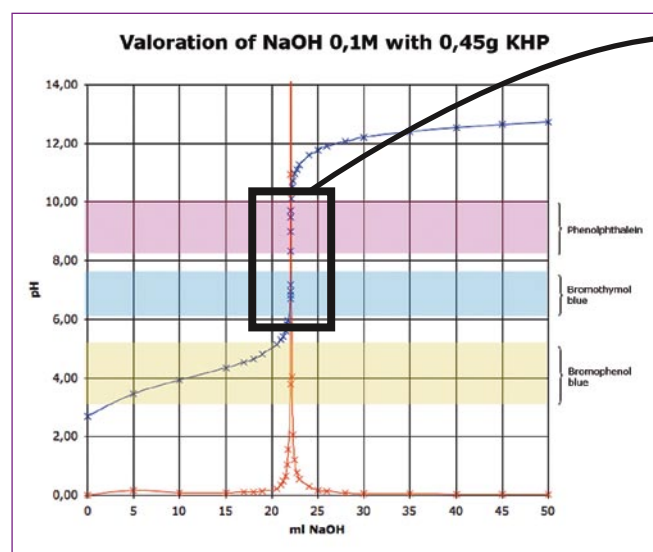


Figure 1

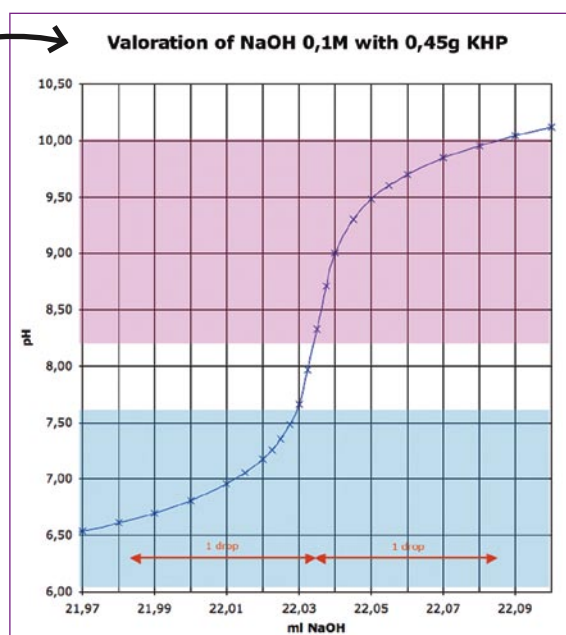


Figure 2

Traceability

All Scharlau solutions are traceable to NIST (National Institute of Standards and Technology) primary reference materials to ensure accurate concentrations.



Titre

The titre or factor of a volumetric solution is the ratio between the molar concentration obtained ($M(x)$) and the molar concentration expected ($Me(x)$).

$$t = M(x) / Me(x)$$

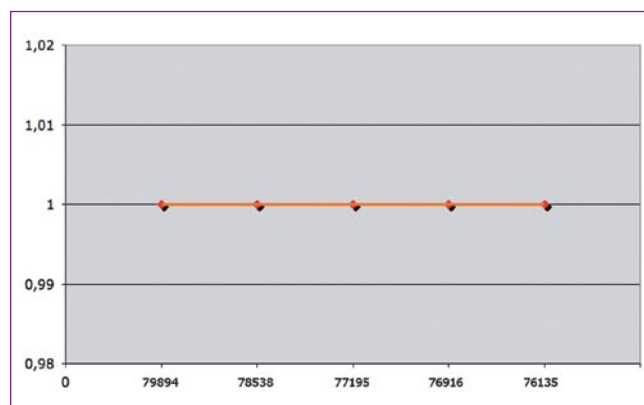
This value is used as a correction titre and should be close to 1. Our solutions are manufactured with a titre of 1.000. Because the titre is important for the results of titrations, solution titre should be checked regularly.

Titration method of volumetric solutions

Product	Method	Agent
Acetic acid	Acid-Base	NaOH
Ammonium iron (III) sulfate	Redox	Na ₂ S ₂ O ₃
Ammonium thiocyanate	Precipitation	AgNO ₃
Bromate-bromide	Redox	Na ₂ S ₂ O ₃
Calcium chloride	Complexometry	EDTA
Cerium (IV) sulfate	Redox	Na ₂ C ₂ O ₄
Copper (II) sulfate	Complexometry	EDTA
Ethylenediaminetetraacetic acid (EDTA)	Complexometry	CaCO ₃
Hanus solution	Redox	Na ₂ S ₂ O ₃
Hydrochloric acid	Acid-Base	TRIS
Iodine	Redox	Na ₂ S ₂ O ₃
Lead (II) nitrate	Complexometry	EDTA
Magnesium chloride	Complexometry	EDTA
Magnesium sulfate	Complexometry	EDTA
Mercury (II) nitrate	Precipitation	NH ₄ SCN
Nitric acid	Acid-Base	TRIS
o-Phosphoric acid	Acid-Base	NaOH
Oxalic acid	Redox	KMnO ₄
Perchloric acid in acetic acid	Acid-Base	KHP
Potassium bromate	Redox	Na ₂ S ₂ O ₂
Potassium dichromate	Redox	Na ₂ S ₂ O ₃
Potassium hexacyanoferrate (III)	Redox	Na ₂ S ₂ O ₂
Potassium hydroxide	Acid-Base	KHP
Potassium permanaganate	Redox	Na ₂ C ₂ O ₄
Potassium thiocyanate	Precipitation	AgNO ₃
Silver nitrate	Precipitation	KCl
Sodium carbonate	Acid-Base	HCl
Sodium chloride	Precipitation	AgNO ₃
Sodium hydroxide	Acid-Base	KHP
Sodium metaarsenite	Redox	I ₂
Sodium thiosulfate	Redox	KIO ₃
Sulfuric acid	Acid-Base	TRIS
Tetrabutylammonium hydroxide	Acid-Base	Benzoic acid
Wijs solution	Redox	Na ₂ S ₂ O ₃
Zinc sulfate	Complexometry	EDTA

Accuracy

To manufacture solutions of accurate concentration, we use modern reactors that allow thorough solution mixing and optimal concentration adjustment to obtain a factor of 1.000.



Factors for 5 consecutive lots of 0,1M hydrochloric acid, Ref. AC0746

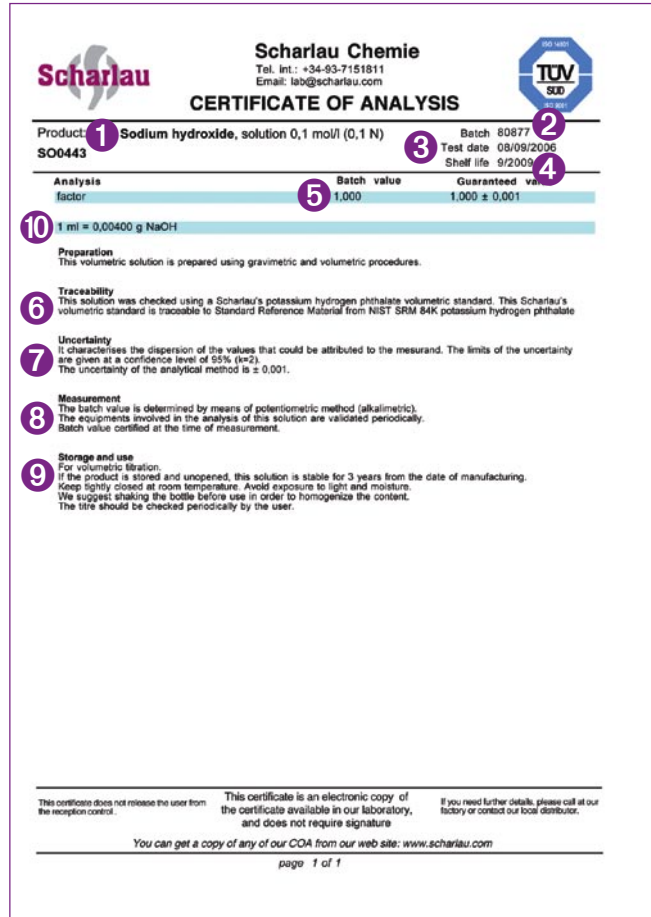
*All solutions
are precise and reliable
for guaranteed quality*



Complete certificate of analysis

Volumetric solutions are used as reference materials to calculate the concentration, and it is important for the certificate of analysis to list all data characterizing the solution.

1. Solution name
2. Lot number
3. Test date
4. Expiry date
5. Titre for current lot
6. Traceability
7. Uncertainty
8. Analytical method
9. Storage and use
10. Composition



Scharlau Chemie
Tel. int.: +34-93-7151811
Email: lab@scharlau.com

CERTIFICATE OF ANALYSIS

Product: **1** Sodium hydroxide, solution 0,1 mol/l (0,1 N) Batch: 80877 **2**
SO0443 Test date: 08/09/2006
 Shelf life: 9/2009 **4**

Analysis factor	Batch value	Guaranteed value
5	1,000	1,000 ± 0,001

10 1 ml = 0,00400 g NaOH

Preparation
This volumetric solution is prepared using gravimetric and volumetric procedures.

6 Traceability
This solution was checked using a Scharlau's potassium hydrogen phthalate volumetric standard. This Scharlau's volumetric standard is traceable to Standard Reference Material from NIST SRM 84K potassium hydrogen phthalate.

7 Uncertainty
It characterises the dispersion of the values that could be attributed to the mesurand. The limits of the uncertainty are given at a confidence level of 95% (k=2).
The uncertainty of the analytical method is ± 0,001.

8 Measurement
The batch value is determined by means of potentiometric method (alkalimetric).
The equipments involved in the analysis of this solution are validated periodically.
Batch value certified at the time of measurement.

9 Storage and use
For volumetric titration.
If the product is stored and unopened, this solution is stable for 3 years from the date of manufacturing.
Keep tightly closed at room temperature. Avoid exposure to light and moisture.
We suggest shaking the bottle before use in order to homogenize the content.
The titre should be checked periodically by the user.

This certificate does not release the user from the reception control. This certificate is an electronic copy of the certificate available in our laboratory, and does not require signature. If you need further details, please call at our factory or contact our local distributor.

You can get a copy of any of our COA from our web site: www.scharlau.com

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Uncertainty

Uncertainty characterises the dispersion of results as a consequence of concentration measurement. Our volumetric solutions have a confidence interval of ±0,1% with a level of confidence of 95% (k=2).

Expiry date

All Scharlau products have the expiry date printed on the bar code label.

The expiry date is also indicated on the certificate of analysis. Ready-to-use volumetric solutions have a shelf life of 3 years, except those with a lower concentration, which have a shelf life of 2 years.



Copies
of all certificates
are available:

www.scharlab.com

www.scharlau.com



Convenient, easy-to-use containers

New HDPE bottle

The most convenient container for volumetric solutions is a 1-litre bottle, as it can be directly used in the automatic titrator. We have improved the design of our HDPE bottle to make it stronger and more stable. The new bottle fits perfectly into the titrator support and does not move, not even when empty. In addition, raised titration marks allow the user to accurately estimate the amount of liquid remaining in the bottle.



Kubitainer 10 l

For high-volume consumption, we recommend our 10-litre Kubitainer. This container consists of a flexible polyethylene bag inside a cardboard box. The liquid is removed from the container through a tap, with the flexible PE container gradually folding as it empties, thus preventing air from entering. This is extremely important to maintain the quality of some solutions that experience a loss of titre when in contact with air. Kubitainer is an environmentally friendly container, since the outer cardboard box is recyclable and PE is a low-volume, incinerable waste.



Custom solutions

A flexible production system allows us to offer custom solutions to our clients. We can prepare your solutions so you can avoid wasting time in an unnecessary laboratory task. Over 50 years of experience in reagent manufacture are your assurance of quality. Please talk to our Sales Department.

Concentrated solutions in ampoules

Each ampoule contains the precise amount of concentrated solution required to prepare, by dilution, 1 litre of volumetric solution at the concentration indicated. However, the concentrate also allows solutions to be prepared at different concentrations by diluting in other volumes of water (e.g., one ampoule of HCl Ref. AC0742 can be used to obtain 1 litre of 0,1 M HCl or 500 ml of 0,2 M HCl).

Each box includes a label with the name and concentration for labelling of the solution container once it has been prepared.

To prepare the volumetric solution, place the ampoule tip on the mouth of a volumetric flask of the desired volume. Turn the plastic cap fitted into the top of the ampoule and break the plastic membrane. This system avoids the need to use glass rods, which can cause accidents when breaking. While holding the ampoule on top of the flask mouth, turn the bottom of the ampoule so that the liquid comes out. Then use distilled water to pick up any remaining liquid in the ampoule and allow it to fall into the volumetric flask. Dilute the flask to volume with water and shake.



Description

Reference

Ammonium thiocyanate, concentrated solution to prepare 1 l of solution 0,1 mol/l (0,1 N)	AM0418
Ethylenediaminetetraacetic acid, EDTA, disodium salt, concentrated solution to prepare 1 l of solution 0,01 mol/l (0,02 N)	AC0966
Ethylenediaminetetraacetic acid, EDTA, disodium salt, concentrated solution to prepare 1 l of solution 0,1 mol/l (0,2 N)	AC0996
Hydrochloric acid, concentrated solution to prepare 1 l of solution 0,1 mol/l (0,1 N)	AC0742
Hydrochloric acid, concentrated solution to prepare 1 l of solution 0,5 mol/l (0,5 N)	AC0759
Hydrochloric acid, concentrated solution to prepare 1 l of solution 1 mol/l (1 N)	AC0743
Iodine, concentrated solution to prepare 1 l of solution 0,05 mol/l (0,1 N)	YO0022
Potassium dichromate, concentrated solution to prepare 1 l of solution 1/60 mol/l (0,1 N)	PO0221
Potassium hydroxide, concentrated solution to prepare 1 l of solution 0,1 mol/l (0,1 N)	PO0276
Potassium hydroxide, concentrated solution to prepare 1 l of solution 1 mol/l (1 N)	PO0277
Potassium permanganate, concentrated solution to prepare 1 l of solution 0,02 mol/l (0,1 N)	PO0333
Silver nitrate, concentrated solution to prepare 1 l of solution 0,1 mol/l (0,1 N)	PL0051
Sodium chloride, concentrated solution to prepare 1 l of solution 0,1 mol/l (0,1 N)	SO0231
Sodium hydroxide, concentrated solution to prepare 1 l of solution 0,01 mol/l (0,01 N)	SO0438
Sodium hydroxide, concentrated solution to prepare 1 l of solution 0,1 mol/l (0,1 N)	SO0427
Sodium hydroxide, concentrated solution to prepare 1 l of solution 0,5 mol/l (0,5 N)	SO0434
Sodium hydroxide, concentrated solution to prepare 1 l of solution 1 mol/l (1 N)	SO0428
Sodium thiosulfate, concentrated solution to prepare 1 l of solution 0,01 mol/l (0,01 N)	SO0738
Sodium thiosulfate, concentrated solution to prepare 1 l of solution 0,1 mol/l (0,1 N)	SO0728
Sulfuric acid, concentrated solution to prepare 1 l of solution 0,05 mol/l (0,1 N)	AC2072
Sulfuric acid, concentrated solution to prepare 1 l of solution 0,5 mol/l (1 N)	AC2073

*The shelf life of concentrated solutions
is usually 5 years*



NEW

Titrasure®. Secondary reference standards for titration

The titre of volumetric solutions may vary over time, making periodic verification advisable, particularly in the case of extremely dilute solutions or solutions that are unstable due to their chemical composition.

Scharlau presents Titrasure®, its new line of reference standards with exceptional purity and homogeneity, indicated for verification of the factor of volumetric solutions.

The Titrasure® reference standards are subject to comprehensive analytical testing to ensure assay and homogeneity. Each manufacturing lot is traced to NIST standards and the label of each container lists the actual lot assay. The standards are packaged in glass flasks and opaque cartons to protect them from light and maintain their quality for a longer time. As a result, Titrasure® helps ensure the reliability of your analytical results.

Characteristics

- High purity ----->
- Accurately determined content ----->
- Lot assay printed on the label ----->
- Certificate of analysis with each unit ----->
- Glass container in opaque carton ----->
- Traceable to NIST ----->
(National Institute of Standards and Technology)

Benefits

- Prevents possible titration interference
- Decreases error associated with the method
- Permits rapid identification
- Offers quality assurance
- Prevents deterioration due to light
- Ensures traceability



Description	Reference	Capacity
Benzoic acid Titrasure®	AC05660080	80 g
Calcium carbonate Titrasure®	CA01850060	60 g
Potassium chloride Titrasure®	PO02070100	100 g
Potassium dichromate Titrasure®	PO02350100	100 g
Potassium hydrogen phthalate Titrasure®	PO01310100	100 g
Potassium iodate Titrasure®	PO04040100	100 g
Sodium chloride Titrasure®	SO02340100	100 g
di-Sodium oxalate Titrasure®	SO05310080	80 g
TRIS Titrasure®	TR04270080	80 g

Quality

All Scharlau chemicals and reagents are manufactured in accordance with ISO 9001:2000.



Availability

More than 5000 references are ready to leave our plant, located near Barcelona.

www.scharlau.com

Whenever necessary, you can access our on-line catalogue and obtain copies of our certificates of analysis and MSDS.

CAT-SOLVE7



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