HYDROQUANT®

Reagents for Water Determination by Karl-Fischer Method

Biosolve

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For over four decades our company produces and distributes selected high purity solvents, reagents and formulations for the research, pharmaceutical and biotechnology industries. Biosolve group meet the latest quality and environmental ISO standards, manufacturing under stringent quality control processes and serving you with the highest quality products on the market.

Biosolve now offers a comprehensive range of coulometric and volumetric **HYDROQUANT®** reagents for water analysis by Karl-Fischer method.

HYDROQUANT® product line makes water determination easy and consistent, given reliable results for a wide range of samples. Products reach endpoint quickly, accurately and with excellent reproducibility, allowing you to perform more titrations in less time.

Benefits of HYDROQUANT® Products:

- **Ready-made solution and reagents for Karl-Fischer titration.**
- **Fast, stable and accurate end points.**
- **Buffered systems for controlled pH.**
- **Long term stability & shelf-life.**
- **Suitability test conformed for each manufactured lot.**
- **Pyridine free formulations feature lower background noise.**

Coulometric Reagents for Karl-Fischer Titration:

HYDROQUANT® coulometric reagents are designed for a wide range of samples for coulometric cells with/without diaphragm. These pyridine-free reagents feature lower background noise which allows a better signal-to-noise ratio. The anolytes have a high water capacity and can take over 1000mg of water per charge.

The stability of **HYDROQUANT®** coulometric reagents were validated for a shelf life of minimum 3 years.

Reagent Name	Catalogue Number	Product Description	Preferred Cell
Hydroquant®AG	086448	Anolyte for universal use	With*/Without diaphragm
Hydroquant®A	092448	Anolyte for universal use	With diaphragm*
Hydroquant®AD	092848	Anolyte for universal use	Without diaphragm
Hydroquant®AG-H	092648	Anolyte for long-chained hydrocarbons	With*/Without diaphragm
Hydroquant®AG Oven	092748	Anolyte for universal use with oven	With*/Without diaphragm
Hydroquant®E	092548	Anolyte for universal use (Ethanol based)	With diaphragm*
Hydroquant®Oil	087848	Anolyte for oils	With diaphragm*
Hydroquant®CG	086548	Catholyte for universal use	With diaphragm
Hydroquant®AK	086248	Anolyte for ketones & aldehydes	With**/Without diaphragm
Hydroquant®CG-K	086348	Catholyte for ketones & aldehydes	With diaphragm

*Used with Hydroquant®CG; **Used with Hydroquant®CG-K

Volumetric Reagents for Karl-Fischer Titration:

HYDROQUANT® volumetric reagents make water determination easy and trouble-free. They are specially formulated to reach endpoint quickly, accurately and with excellent reproducibility. **HYDROQUANT®** volumetric reagents are designed for existing application procedures allowing you to perform more titrations in less time.

The one-component volumetric reagents have unlimited water capacity and are widely used for general purpose of KF titrations. Although they can be slower than the two-component titrations, the speed of their titrations can be accelerated with Methanol accelerate reagent. The stability of the one-component volumetric reagents was validated for a shelf life of over 3 years, with an average titer loss of ~ 5% per year.

The two-component volumetric reagents show better accuracy for low water contents, faster titration speed and have high buffering capacity. Their titer is stable over 5 years.

Volumetric One-Component Reagents:

Reagent Name	Catalogue Number	Product Description	Preferred With
Uniquant 1	082148	One-component reagent 1ml = 1 mg H_2O	Methanol extra-dry
Uniquant 2	082348	One-component reagent 1ml = 2 mg H_2O	Methanol extra-dry
Uniquant 5	082548	One-component reagent 1ml = 5 mg H_2O	Methanol extra-dry
Unisolvent E	090848	Ethanol-based working medium	Uniquant 1, 2 or 5
Methanol accelerate	091148	Working medium for accelerated volumetric one-component KF titration	Uniquant 1, 2 or 5
Methanol extra-dry	136847	Working medium for universal use	Uniquant 1, 2 or 5
Lipounisolvent MC	090948	Working medium for non-polar substances, fats and oils (Contain Methanol/Chloroform)	Uniquant 1, 2 or 5
Lipounisolvent HM	091048	Working medium for non-polar substances, fats and oils (Contain 1-Hexanol/Methanol)	Uniquant 1, 2 or 5
Solvent Oil	091248	Working medium for volumetric one- and two-component KF titration in oils	Uniquant 1, 2 or 5 And Titrant 1, 2 or 5
Uniquant 5K	086948	One-component reagent 1ml = 5 mg H_2O for titration in ketones and aldehydes	Unisolvent K or Ketosolvent
Unisolvent K	086748	Working medium for ketones and aldehydes (Contain 2,2,2-Trifluoroethnol)	Uniquant 5k
Ketosolvent	091748	Working medium for ketones and aldehydes (Contain Ethanol)	Uniquant 5k

Volumetric two-component reagents:

Reagent Name	Catalogue Number	Product Description	Preferred With
Titrant 2	082248	Two-component reagent 1ml = 2 mg H_2O (Methanol based)	Solvent
Titrant 5	082448	Two-component reagent 1ml = 5 mg H_2O (Methanol based)	Solvent
Titrant 2E	092348	Two-component reagent 1ml = 2 mg H_2O (Ethanol based)	Solvent E
Titrant 5E	092248	Two-component reagent 1ml = 5 mg H_2O (Ethanol based)	Solvent E
Solvent	082648	Working medium for volumetric two-component KF titration	Titrant 1, 2 or 5
Solvent E	091848	Working medium for volumetric two-component KF titration (Contain Ethanol)	Titrant 2E or 5E
Solvent Oil MC	091948	Working medium for non-polar substances, fats and oils (Contain Methanol/Chloroform)	Titrant 1, 2 or 5
Solvent Oil HM	092148	Working medium for non-polar substances, fats and oils (Contain 1-Hexanol/Methanol)	Titrant 1, 2 or 5

HYDROQUANT® ·Reagents for Acids and Bases

The volumetric and coulometric **HYDROQUANT®** reagents are buffered systems stabilized around the ideal value between 5 to 7 ensuring a rapid and stoichiometric course of reaction. However, when large amounts of acidic or basic samples are titrated the pH balance may be interrupted and one should adjust the pH value to the ideal range by adding weak bases, weak acids or buffer solutions to the working medium.

The added amount of base should not increase the pH above the level of 8 where no end point is reached, and the added amount of acid should not reduce the pH lower than 4 which may slow down the titration rate. Thus, buffering systems which neutralize and stabilize the pH during the reaction are suitable for this purpose.

HYDROQUANT®-Base buffer is a suitable working medium for basic samples, it contains salicylic acid and the buffer capacity is about 1 mmol per ml. Benzoic acid and salicylic acid may also be used for strong basic samples.

HYDROQUANT®-Solvent can be used as a buffering system for acidic samples; each 1 ml of buffer can neutralize about 0.6 mmol of acid. For larger quantities of acidic samples, the addition of **HYDROQUANT®**-Acid buffer can be used, the buffer capacity is about 5 mmol per ml; in addition, it can be used to neutralize certain carboxylic acids that tend to esterify. Pyridine and Imidazole can be used for strong acidic media.

Reagent Name	Catalogue Number	Product Description	Preferred use
Acid Buffer	082748	Capacity 5 mmol acid/ml	Buffer for pH stabilization of acidic samples
Base Buffer	085148	Capacity 1 mmol base/ml	Buffer for pH stabilization of basic samples titration
Imidazol	090648	Neutralizing base	For strong acidic samples.
Pyridine	162548	Neutralizing base	For strong acidic samples.
Salicylic acid	173248	Neutralizing acid	For strong basic samples.
Benzoic acid	035848	Neutralizing acid	For strong basic samples.

Influence of Co-Solvent

The Karl-Fischer titration can be applied to a wide variety of substances. The differences in sample properties and solubility can influence the course of the Karl-Fischer reaction, therefore, there are number of ways to adjust the working medium to improve solubility of the sample enabling a direct Karl-Fischer titration. Some examples for the medium variations are described:

- Pyridine is a good polar solvent, also acts as basic solvent for neutralization of acids.
- Toluene and xylene improve solubility of oils.
- The addition of long-chain alcohols or chloroform to the working medium can improve the solubility of fats, oils and long-chain hydrocarbons.
- Addition of formamide improves solubility of polar materials like: proteins, carbohydrates and inorganic salts which are either insoluble or dissolve only slightly in methanol.
- Acetonitrile is a good polar solvent.
- 1-Methyl-2-Pyrrolidone dissolves certain polymers and can be used up to 40-50% of the volumetric working medium.

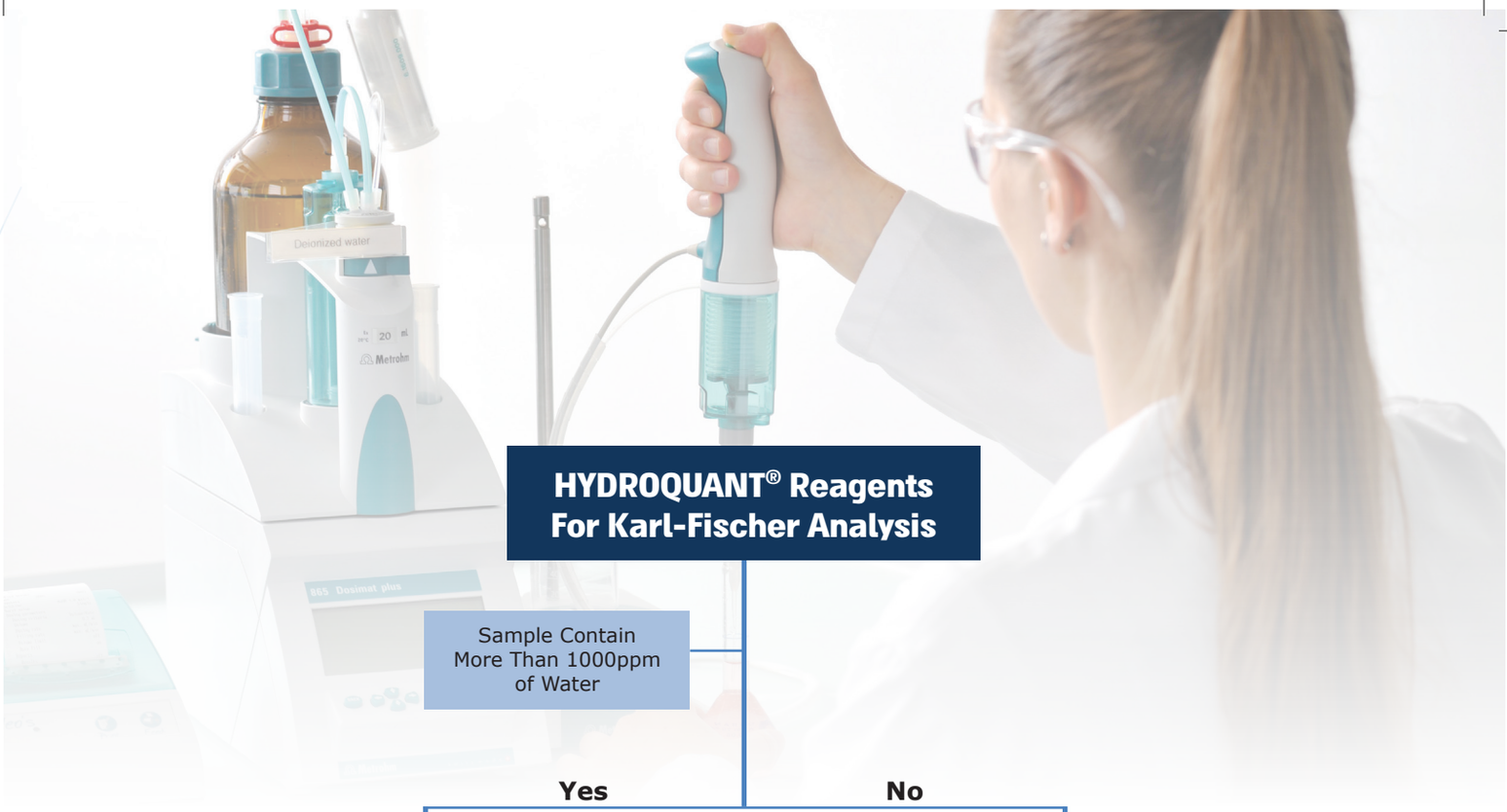
If the working medium is modified, the requirements of the Karl-Fischer reaction must be considered, therefore, it is our recommendations:

- To check the working conditions by determining the titer of the titrant used with the modified working medium, and
- To verify the stoichiometry by using water standards.

Partial List of Co-Solvents:

Reagent Name	Catalogue Number	Water Content
Acetonitrile	012054	Max. 0.003%
Chloroform	030847	Max. 0.005%
Formamide	087648	Max. 0.02%
2-Propanol	162647	Max. 0.01%
Toluene	201547	Max. 0.003%
1-Methyl-2-Pyrrolidone	135647	Max. 0.005%

For further inquiry of dry co-solvents, please contact us at: info@biosolve-chemicals.com



HYDROQUANT® Reagents For Karl-Fischer Analysis

Sample Contain More Than 1000ppm of Water

Yes

HYDROQUANT® Volumetric Reagents

Sample Contain Aldehyde or Ketone

Yes

One Component Titrant:

Uniquant 5K	086948

One Component Solvent:

Unisolvent K	086748
Ketosolvent	091748

No

One Component Titrant:

Uniquant 1	082148
Uniquant 2	082348
Uniquant 5	082548

One Component Solvent:

Methanol Extra-Dry	136847
Methanol accelerate	091148
Lipounisolvent MC	090948
Lipounisolvent HM	091048
Unisolvent Oil	091248
Unisolvent E	090848

Two Component Titrant:

Titrant 2	082248
Titrant 5	082448
Titrant 2E	092348
Titrant 5E	092248

Two Component Solvent:

Solvent	082648
Solvent Oil MC	091948
Solvent Oil HM	092148
Solvent E	091848

No

HYDROQUANT® Coulometric Reagents

Sample Contain Aldehyde or Ketone

Yes

Anolyte With/Without Diaphragm:**

Hydroquant®AK	086248

Catholyte:

Hydroquant®CG-K	086348

No

Anolyte With*/Without Diaphragm:

Hydroquant®AG	086448
Hydroquant®AG-Oven	092748
Hydroquant®AG-H	092648

Anolyte With Diaphragm*:

Hydroquant®A	092448
Hydroquant®E	092548
Hydroquant®Oil	087848

Anolyte Without Diaphragm:

Hydroquant®AD	092848

Catholyte:

Hydroquant®CG	086548

*Used with Hydroquant®CG; **Used with Hydroquant®CG-K

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