

Karl-Fischer Reagents ROTI® Hydroquant



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Karl Fischer Reagents

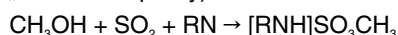
Karl Fischer Reagents ROTI®Hydroquant

There are two established Karl Fischer methods of calculating the water content of a substance: Volumetric analysis and coulometric analysis. Which method is chosen depends primarily on the water content that the sample is expected to have. Making the right choice is vital for obtaining reliable and reproducible results. Carl ROTH offers compatible reagents for both of these methods.



Volumetric Reagents

Karl Fischer volumetric analysis is recommended if the water content of a sample ought to be between 0,1 % and 100 %. Volumetric analysis is performed by measuring the amount of Karl Fischer reagent that needs to be added to a substance until the end point of the titration has been reached. In alcoholic solutions, water reacts 1:1 with iodine in the presence of sulphur dioxide. Methanol and sulphur dioxide form an acid ester that is neutralised by the base (e.g. imidazole, hereafter referred to as „RN“ for simplicity).



In the titration process, iodine is added which reacts with water to be reduced to colourless iodide:



This reaction continues until there is no water left. The end point is determined by a change in colour due to a surplus of iodine and measured using a potentiometer.

Single-component Reagents

Single-component reagents contain all the substances required for the Karl Fischer reaction in a single solution. They are easy to use and provide for a high level of flexibility when choosing a solvent for the sample type. The high reactivity of the components means that the titre for single-component reagents must always be determined before titration is carried out. Reactions with standard reagents containing methanol are not possible for samples that contain aldehydes or ketones, as the methanol will react with them to produce extra water in a secondary reaction. Carl ROTH offers methanol-free reagents that are suitable for substances containing aldehydes and ketones.

Product name	Purity	General application	Art. No.	Pack Qty.
Karl Fischer ROTI®Hydroquant methanol D	for KF titration, dry	Solvent component. For use with item number T194, T190, 1T13 or 22L4.	T193.1 T193.2	1 l 2.5 l
Karl Fischer ROTI®Hydroquant Working Medium K	for KF titration, for aldehydes and ketones	Solvent component. For use with item number 5211.	5215.1	1 l
Karl Fischer ROTI®Hydroquant C5 K	5 mg H ₂ O/ml, for KF titration, for aldehydes and ketones	Single-component reagent. For use with item number 5215 ou 22L6.	5211.1	1 l
Karl Fischer ROTI®Hydroquant C1	1 mg H ₂ O/ml, pyridine-free	Single-component reagent. For use with item number T193, 1PPH ou 22L5.	22L4.1	500 ml
Karl Fischer ROTI®Hydroquant C2	2 mg H ₂ O/ml, pyridine-free	Single-component reagent. For use with item number T193, 1PPH ou 22L5.	T194.1	1 l
Karl Fischer ROTI®Hydroquant C5	5 mg H ₂ O/ml, pyridine-free	Single-component reagent. For use with item number T193, 1PPH ou 22L5.	T190.1	1 l
Karl Fischer ROTI®Hydroquant C5 plus	5 mg H ₂ O/ml, pyridine-free	Single-component reagent. For use with item number T193, 1PPH ou 22L5.	1T13.1	1 l
Karl Fischer ROTI®Hydroquant CS E	for KF titration, ethanol-based	Solvent component, ethanol-based. For use with item number T194, T190 or 22L4.	22L5.1	1 l
Karl Fischer ROTI®Hydroquant CS KE	for KF titration, ethanol-based, for aldehydes and ketones	Solvent component. For use with item number 5211.	22L6.1	500 ml
Karl Fischer ROTI®Hydroquant Methanol quick	for KF titration	Solvent component for accelerated KF reaction. For use with item number T194, T190, 1T13 or 22L4.	1PPH.1	1 l
Karl Fischer ROTI®Hydroquant Fat Solver MH	for KF titration	Solvent component for non-polar substances like fats and oils, contains methanol and hexanol. For use with item number T194, T190, 1T13 or 22L4.	20TL.1	500 ml
Karl Fischer ROTI®Hydroquant Fat Solver CM	for KF titration	Solvent component for non-polar substances like fats and oils, contains chloroform and methanol. For use with article number T194, T190, 1T13 or 22L4.	22L7.1	1 l
Karl Fischer ROTI®Hydroquant Fat Solver crude oil	for KF titration	Solvent component for non-polar substances like raw oil, contains chloroform, xylene and methanol. For use with ROTI®Hydroquant C or T.	22LC.1	1 l

For additional product data and safety information, see our current catalogue or at www.carlroth.com

Karl Fischer Reagents

Two-components Reagents

In two-component systems, the substances crucial for the reaction are separated, with some in the solvent component and some in the titration component. Separating the substances gives the system a longer shelf life and means that the titre needs to be determined less frequently.

Product name	Purity	General application	Art. No.	Pack Qty.
Karl Fischer ROTI®Hydroquant S	for KF titration	Solvent component. For use with item number X947 or T191.	T192.1	1 l
Karl Fischer ROTI®Hydroquant S CM	for KF titration	Solvent component. For use with item number X947 or T191.	5218.1	1 l
Karl Fischer ROTI®Hydroquant S Oil	for KF titration	Solvent component for non-polar substances like fats and oils. For use with item number X947 or T191.	20TK.1	1 l
Karl Fischer ROTI®Hydroquant T2	2 mg H ₂ O/ml, pyridine-free	Titration component. Two-components reagent. For use with item number T192, 5218 or 20TK.	X947.1	1 l
Karl Fischer ROTI®Hydroquant T5	5 mg H ₂ O/ml, pyridine-free	Titration component. Two-components reagent. For use with item number T192, 5218 or 20TK.	T191.1	1 l
Karl Fischer ROTI®Hydroquant T2 E	2 mg H ₂ O/ml, pyridine-free, ethanol-based	Titration component. Two-components reagent, ethanol-based. For use with item number 22LA.	22L8.1	1 l
Karl Fischer ROTI®Hydroquant T5 E	5 mg H ₂ O/ml, pyridine-free, ethanol-based	Titration component. Two-components reagent, ethanol-based. For use with item number 22LA.	22L9.1	1 l
Karl Fischer ROTI®Hydroquant S E	for KF titration, ethanol-based	Solvent component. For use with item number 22L8 or 22L9.	22LA.1	1 l

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Table illustrating the uses of Karl Fischer ROTI®Hydroquant volumetric reagents:

		Solvent components											
		Methanol (T193)	Methanol (1PPH)	Working medium K (5215)	CS E (22L5)	CS KE (22L6)	Fat Solver MH (20TL)	Fat Solver CM (22L7)	Fat Solver crude oil (22LC)	S (T192)	S CM (5218)	S Oil (20TK)	S E (22LA)
Titration components	C1 (22L4)	X	X		X		X	X	X				
	C2 (T194)	X	X		X		X	X	X				
	C5 (T190)	X	X		X		X	X	X				
	C5 plus (1T13)	X	X		X		X	X	X				
	C5 K (5211)			X		X							
	T2 (X947)								X	X	X	X	
	T5 (T191)								X	X	X	X	
	T2 E (22L8)												X
	T5 E (22L9)												X

The volumetric Karl Fischer reagents are suitable for water contents between 0,1 % and 100 %.

Free water and water of hydration can be determined, respectively. Our solutions are based on methanol and free of pyridine.

Using single-component reagents:

Add solvent to the reaction vessel and titrate to dryness with the C-component. Then add the sample and titrate again to dryness.

Using two-component reagents:

Add solvent to the reaction vessel and titrate to dryness with the T-component. Then add the sample and titrate again to dryness.

Karl Fischer Reagents

Coulometric Reagents

Karl Fischer coulometric titration is suitable for substances with a low water content (i.e. <0,1 %) and, for example, for expensive substances that can only be examined in small quantities.

In the coulometric titration process, the iodine required is produced directly in situ at the electrode in the reaction vessel through the anodic oxidation of iodide. Hydrogen is produced at the cathode. The measuring cell contains an anode and cathode chamber, which can be separated by a diaphragm. This means that the titration cell can be equipped with diaphragms or be diaphragm-free.

Carl ROTH offers suitable reagents for both models.

For cells with diaphragms:

Anolyte:

Product name	Purity	General application	Pack.	Art. No.	Pack Qty.
Karl Fischer ROTI®Hydroquant coulo A	for KF titration, coulometric	Anolyte for cells with diaphragm. Use with Karl Fischer ROTI®Hydroquant coulo CG (9861).	glass	9957.1	500 ml
Karl Fischer ROTI®Hydroquant coulo AG Oven	for KF titration, coulometric, with oven	Single-component reagent for cells without diaphragm, for oven methode. Can also be used as anolyte for cells with diaphragm, with Karl Fischer ROTI®Hydroquant coulo CG (9861).	glass	223E.1	500 ml
Karl Fischer ROTI®Hydroquant coulo AG-H	for KF titration, coulometric	Anolyte for cells with diaphragm, for long-chain hydrocarbons, contains methanol and pentanol.	glass	22L2.1	500 ml
Karl Fischer ROTI®Hydroquant coulo AK	for KF titration, coulometric, for aldehydes and ketones	Anolyte for cells with diaphragm. Use with Karl Fischer ROTI®Hydroquant coulo CG-K (1KPP).	glass	1KPN.1	500 ml
Karl Fischer ROTI®Hydroquant coulo E	for KF titration, coulometric, ethanol-based	Anolyte for cells with or without diaphragm ethanol-based.	glass	22L3.1	500 ml
Karl Fischer ROTI®Hydroquant coulo Oil	for KF titration, coulometric	Anolyte for cells with diaphragm. Use with Karl Fischer ROTI®Hydroquant coulo CG (9861).	glass	9960.1	100 ml

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Catholyte:

Product name	Purity	General application	Pack.	Art. No.	Pack Qty.
Karl Fischer ROTI®Hydroquant coulo CG	for KF titration, coulometric	Catholyte for cells with diaphragm. Use with Karl Fischer ROTI®Hydroquant coulo A (9957) or coulo Oil (9960).	glass	9861.1	100 ml
Karl Fischer ROTI®Hydroquant coulo CG-K	for KF titration, coulometric, for aldehydes and ketones	Catholyte for cells with diaphragm. Use with Karl Fischer ROTI®Hydroquant coulo AK (1KPN).	glass	1KPP.1	10 unit(s)

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Karl Fischer Reagents



For cells without diaphragms:

Product name	Purity	General application	Pack.	Art. No.	Pack Qty.
Karl Fischer ROTI®Hydroquant coulo AD	for KF titration, coulometric	Single-component reagent for cells without diaphragm	glass	1KPL.1	500 ml
Karl Fischer ROTI®Hydroquant coulo AG	for KF titration, coulometric	Single-component reagent for cells without diaphragm	glass	9854.1	500 ml
Karl Fischer ROTI®Hydroquant coulo AG Oven	for KF titration, coulometric, with oven	Single-component reagent for cells without diaphragm, for oven methode. Can also be used as anolyte for cells with diaphragm, with Karl Fischer ROTI®Hydroquant coulo CG (9861).	glass	223E.1	500 ml
Karl Fischer ROTI®Hydroquant coulo E	for KF titration, coulometric, ethanol-based	Anolyte for cells with or without diaphragm ethanol-based.	glass	22L3.1	500 ml

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Table illustrating the uses of Karl Fischer Roti®Hydroquant coulometric reagents:

	Speciality	coulo CG (9861)	coulo CG-K (1KPP)	
coulo A (9957)		X for cells with diaphragms		
coulo Oil (9960)		X for cells with diaphragms		
coulo AK (1KPN)	for aldehydes and ketones		X for cells with diaphragms	
coulo AG-H (22L2)	for long-chain hydrocarbons	X for cells with diaphragms		
coulo AD (1KPL)				Can be used without additional reagents. For cells without diaphragms.
coulo AG (9854)				Can be used without additional reagents. For cells without diaphragms.
coulo AG oven (223E)	for oven method	X for cells with diaphragms		Can be used without additional reagents. For cells without diaphragms.
coulo E (22L3)	ethanol based	X for cells with diaphragms		Can be used without additional reagents. For cells without diaphragms.

Karl Fischer Reagents

Karl Fischer Standards

Water standards with a defined water content are required to determine the titre for the reagents used. Either a solid or a liquid standard can be chosen.



Standards

Product name	Purity	General application	Packaging	Art. No.	Pack Qty.
Karl Fischer ROTI®Hydroquant standard sodium tartrate dihydrate	≥99 %, for KF titration	Primary standard substance for Karl Fischer titration. Water standard for KF volumetry.	100 g	5229.1	100 g
Karl Fischer ROTI®Hydroquant water standard 0.1	0,1 mg H ₂ O/g	Water standard 0.01 % for KF coulometry	10 x 8 ml ampoules	1KPT.1	10 unit(s)
Karl Fischer ROTI®Hydroquant water standard 1.0	1 mg H ₂ O/g	Water standard 0.1 % for KF coulometry	10 x 4 ml ampoules	9971.1	10 unit(s)
Karl Fischer ROTI®Hydroquant water standard 5.0	5,0 mg H ₂ O/ml	Water standard 0.5 % for KF volumetry	500 ml	1KPK.1	500 ml
Karl Fischer ROTI®Hydroquant water standard 10.0	10 mg H ₂ O/g	Water standard 1 % for KF volumetry	10 x 8 ml ampoules	5219.2	10 unit(s)
Karl Fischer ROTI®Hydroquant water standard oven	1 %	Solid water standard for KF oven methode, contains sodium tungstate, measurement at approx. 160 °C	5 g	207C.1	5 g
	5 %	Solid water standard for KF oven methode, contains lactose, measurement at 140-160 °C	10 g	207E.1	10 g
	5,55 %	Solid water standard for KF oven methode, contains potassium citrate, measurement at 220-230 °C	10 g	207H.1	10 g
Karl Fischer ROTI®Hydroquant water standard Oil	<30 ppm H ₂ O, mineral oil based	Water standard for KF titration in oil matrices	10 x 8 g ampoules	207K.1	10 unit(s)
Karl Fischer ROTI®Hydroquant water standard low water	30-40 ppm H ₂ O	Water standard for KF oven methode, contains dichloromethane	10 x 5 ml ampoules	207L.1	10 unit(s)

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Karl Fischer Auxiliaries

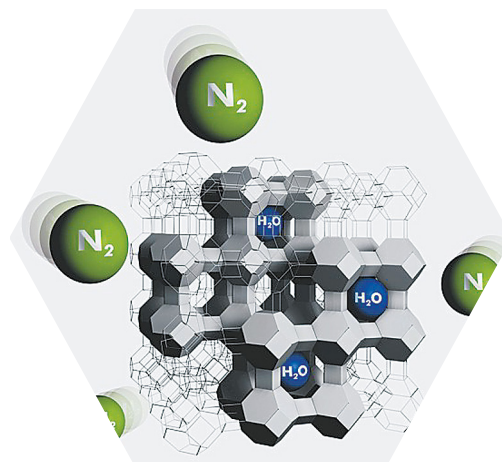
Other auxiliary reagents can also be used for special requirements. Carl ROTH offers buffers, solvents and other reagents for this purpose.

Product name	Purity	General application	Art. No.	Pack Qty.
Karl Fischer ROTI®Hydroquant Acidic Buffer	for KF titration	Buffer substance for Karl Fischer titration	22LH.1	500 g
	for KF titration, buffer capacity 5 mmol acid/ml	Buffer component, additive for acidic samples.	20TN.1	500 ml
Karl Fischer ROTI®Hydroquant Basic Buffer	for KF titration	Buffer component, additive for basic samples.	22LE.1	1 l
Karl Fischer ROTI®Hydroquant Formamide	for KF titration	Solvent for Karl Fischer titration	22LL.1	1 l
Karl Fischer ROTI®Hydroquant Imidazole	for KF titration	Buffer substance for Karl Fischer titration	22LT.1	500 g
Karl Fischer ROTI®Hydroquant Salicylic acid	for KF titration	Buffer substance for Karl Fischer titration	22LK.1	500 g
Karl Fischer ROTI®Hydroquant Trichloromethane/Chloroform	for KF titration	Solvent for Karl Fischer titration	22LP.1	1 l
Karl Fischer ROTI®Hydroquant Xylene	for KF titration	Solvent for Karl Fischer titration	22LN.1	1 l

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Karl Fischer Reagents

Molecular Sieves



For drying, cleaning or separating liquids and gases.

Properties:

- Spherical or powdered metal aluminosilicates
- Spheres Ø 1,6–2,5 mm and 2,5–5,0 mm
- Active surface: 600–700 m²/g
- Activated at 500–600 °C; we nevertheless recommend activating the molecular sieve again before using it for the first time

Application:

- In desiccators, drying tubes, columns
- For drying streaming gases
- For absolving organic solvents
- For separating organic solvents

Product name	Purity	Ball diameter	Pack.	Art. No.	Pack Qty.			
Molecular sieve 3 Å	powder, ≤40 µm	1,6-2,5 mm	plastic	1YLH.1	250 g			
				1YLH.2	1 kg			
				1YLH.3	5 kg			
	0,3 nm, type 564, beads		glass	8487.1	250 g			
				8487.2	750 g			
				8487.3	2.5 kg			
			plastic	8487.7	5 kg			
				P729.1	250 g			
				P729.2	750 g			
0,3 nm, type 562 C, beads	glass	plastic	P729.3	2.5 kg				
			Molecular sieve 4 Å	0,4 nm, type 514, beads	1,6-2,5 mm	glass	8471.1	250 g
							8471.2	750 g
8471.3	2.5 kg							
Molecular sieve 5 Å	0,5 nm, type 522, beads	1,6-2,5 mm	glass	8475.1	250 g			
				8475.2	750 g			
			plastic	8475.3	2.5 kg			
				Molecular sieve 10 Å	1,0 nm, type 544, beads	1,6-2,5 mm	glass	8483.1
8483.2	750 g							
8483.3	2.5 kg							

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Are you looking for a titration device for Karl Fischer titration?

We will be happy to assist you in selecting the right device.

+49 721 5606 - 512

applications@carlroth.com



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Contact international:

Phone +49 721/5606 510 · Fax +49 721/5606 111 · info@carlroth.com · www.carlroth.com

Carl Roth GmbH + Co. KG · Schoemperlenstr. 3-5 · D-76185 Karlsruhe

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