

## VWR® KARL FISCHER REAGENTS

Ready to use solutions,  
reagents and standards  
for volumetric and  
coulometric analyses

Fast, stable and  
accurate endpoints

Buffered systems for  
controlled pH

Long-term stability  
and shelf life

Every batch verified

**FOR ANALYTICAL CHEMISTS WHO NEED  
ACCURATE WATER CONTENT – EVERY TIME**

## Volumetric range for high water content analysis

### Single-component reagents, two-component reagents and reagents especially designed for aldehydes and ketones.

- **Reliable:** Fast and stable endpoints for accurate results time and time again
- **Safe:** Low toxicity and pyridine-free
- **Consistent:** Comparable to other leading brands



#### Volumetric one-component titrating reagents

Description	Cat. No. 1 l pack	Cat. No. 2,5 l pack
CombiNORM 1 for volumetric one-component KF titration (methanol-free) water equivalent 1 ml = 1 mg used with methanol (Cat. No. 85457.290)	85450.290	-
CombiNORM 2 for volumetric one-component KF titration (methanol-free) water equivalent 1 ml = 2 mg used with methanol (Cat. No. 85457.290)	85451.290	85451.320
CombiNORM 5 for volumetric one-component KF titration (methanol-free) water equivalent 1 ml = 5 mg used with methanol (Cat. No. 85457.290)	85452.290	85452.320
Combi solvent E for volumetric one-component KF titration (ethanol-based working medium)	85454.290	85454.320
Lipo solvent CM non polar for non polar substances, fats and oils (working medium)	85455.290	-
Lipo solvent HM non polar reagent for volumetric one-component KF titration in non polar substances, fats and oils (working medium)	85456.290	-
Methanol quick for accelerating volumetric one-component KF titration (working medium) used with CombiNORM	85457.290	85457.320
Keto solvent for volumetric one-component KF titration in aldehydes and ketones (working medium)	85459.290	-
CombiNORM 5K reagent for volumetric one-component Karl Fischer titration in aldehydes and ketones (methanol-free) 1 ml = 5 mg used with Solvent K (Cat. No. 85464.290)	85463.290	85463.320
K reagent for volumetric one-component KF titration in aldehydes and ketones (working medium) used with CombiNORM 5K (Cat. No. 85463.290)	85464.290	85464.320

#### Volumetric two-component titrating reagents

Description	Cat. No. 1 l pack	Cat. No. 2,5 l pack
Solvent for volumetric two-component KF titration (working medium) used with all TitrANTs	85453.290	85453.320
Solvent (crude) for volumetric one- and two-component KF titration in oils (working medium)	85458.290	-
Solvent E reagent for volumetric two-component KF titration (ethanol-based working medium)	85460.290	-
Solvent CM reagent for volumetric two-component KF titration in oils (working medium)	85461.290	-
Solvent OIL reagent for volumetric two-component KF titration in oils (working medium)	85462.290	-
TitrANT 1 for volumetric two-component KF titration water equivalent 1 ml = 1 mg used with Solvent (Cat. No. 85453.290)	85465.290	-
TitrANT 2 for volumetric two-component KF titration water equivalent 1 ml = 2 mg used with Solvent (Cat. No. 85453.290)	85466.290	-
TitrANT 2E for volumetric two-component KF titration (ethanol-based) water equivalent 1 ml = 2 mg used with Solvent E (Cat. No. 85460.290)	85467.290	85467.320
TitrANT 5 for volumetric two-component KF titration water equivalent 1 ml = 5 mg used with Solvent (Cat. No. 85453.290)	85468.290	85468.320
TitrANT 5E for volumetric two-component KF titration (ethanol-based) water equivalent 1 ml = 5 mg used with Solvent E (Cat. No. 85460.290)	85469.290	-

## Coulometric range for low water content at ppm level

Both anolyte and catholyte solutions have been re-formulated to offer better performance. This improved formulation increases both the speed and accuracy of titration when determining water content at the microgram level.

- **Fast:** Reach the endpoint quickly and consistently
- **Convenient:** Long product shelf life
- **Reliable:** Very stable endpoint



Coulometry reagent	Pk (ml)	Cat. No.
<b>Anolyte solutions</b>		
AG for cells with and without diaphragm	1000	85470.290
A preferred for cells with diaphragm	500	85472.260
E (ethanol-based) for cells with and without diaphragm	500	85473.260
AD for cells without diaphragm	500	85474.260
AG-H for applications with long-chained hydrocarbons, for cells with and without diaphragm	500	85475.260
A OVEN for use with oven, for cells with and without diaphragm	500	85476.260
OIL for applications with oils, preferred for cells with diaphragm	500	85477.260
K for applications with ketones, preferred for cells with diaphragm	500	85478.260
<b>Catholyte solutions</b>		
CG	50	85471.130
CG-K for applications with ketones	50	85479.130

## Water standards

Our water standard range comprises of three parts.

### Standards for coulometric Karl Fischer titrations for water in liquid petroleum

- Packed in sets of 10x2 ml, 10x5 ml, or 5x20 ml
- Conform to ASTM D1744, E1064, D4377



Water standard	Pk	Cat. No.
<b>Coulometric standards</b>		
1% - 1 g contains 10,0 mg H <sub>2</sub> O	10x4 g	85487.004
<b>Volumetric standards</b>		
0,5% - 1 ml methanol contains 5,0 mg H <sub>2</sub> O	250 ml	85488.230
1% - 1 ml methanol contains 10,0 mg H <sub>2</sub> O	500 ml	85489.260

### Standards for coulometric and volumetric Karl Fischer titrations

Karl Fischer water standard in liquid petroleum	Pk	Cat. No.
60 µg/g	10x5 ml	85482.005
	10x2 ml	85483.002
	5x20 ml	85483.020
100 µg/g	10x5 ml	85483.005
	10x2 ml	85484.002
	5x20 ml	85484.020
1000 µg/g	10x5 ml	85484.005
	10x2 ml	85485.002
	5x20 ml	85485.020
5000 µg/g	10x5 ml	85485.005
	10x2 ml	85485.020
	5x20 ml	85485.020

### Solid standard for Karl Fischer and Karl Fischer oven

Description	Pk	Cat. No.
di-Sodium tartrate dihydrated, secondary standard for Karl Fischer	100 g	85692.100

## Troubleshooting

### Working medium variations: Influence of C-Solvent

The Karl Fischer titration can be applied to a wide variety of substances, but differences in sample properties and solubility can influence the Karl Fischer reaction. However, there are number of ways to adjust the working medium to improve solubility of the sample enabling direct Karl Fischer titration.

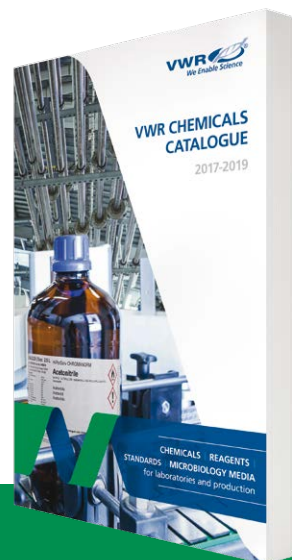
#### Here are some ideas...

- Pyridine is a good polar solvent, also acts as basic solvent for neutralisation of acids but is foul smelling
- Imidazol can be used for neutralisation acids for strong acidic samples
- Toluene and xylene improve solubility of oils
- Addition of formamide improves solubility of polar materials like proteins, carbohydrates and inorganic salts that are either insoluble or dissolve only slightly in methanol
- Acetonitrile is a good polar solvent
- N Methylpyrrolidone dissolves polymers and can be used up to 40% of the volumetric working medium
- Addition of long chain alcohols or chloroform can improve the solubility of fats, oils and long chain hydrocarbons



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