

HYDRANAL™ Technical Information Sheet T007 Rev. 2

HYDRANAL Water Standards Use and Handling

Hydranal Water Standards are suitable to check the reliability of Karl Fischer (KF) equipment on a regular basis, for example according to ISO 9001, chapter "Control of monitoring and measuring devices" or according to requirements of the European Pharmacopoeia. They can also be used to show the accuracy of a determination, before, between or after a single sample injection.

Several Hydranal Water Standards are based on solvents or solvent mixtures which are most suitable for the dedicated water content and the handling of the standards under average conditions. Hydranal-Water Standard Oil is based on mineral oil. Using the standards by weight provides the highest accuracy which in such case is not influenced by the ambient temperature.

After opening an ampoule the content of water can be influenced by air humidity. In an air conditioned laboratory often humidity is very low and the dry air tends to absorb moisture from the standard in an opened ampoule. From measurement to measurement the result becomes lower. On the other hand, if humidity in the laboratory is very high, the standard might absorb moisture. In this case the amount of water found is getting higher and higher. Proper handling by using proper labware can help minimize the influence of the ambient moisture.

Especially for the standards with the low water content, like Hydranal-Water Standard 1.0 and Hydranal-Water Standard 0.1 PC, both packed in 4 mL ampoules, we recommend using glass syringes, ideally a 5 mL glass gas-tight syringe.

For Hydranal-Water Standard 10.0 or Hydranal-Water Standard Oil, both packed in 8 mL ampoules, the use of a 10 mL glass syringe is recommended.

In order to handle the standards reliable, the following procedure is recommended. Protect your hands by wearing laboratory gloves. Open the ampoule directly before use.

1. Shake the ampoule
2. Snap off the top tag of the ampoule at the predetermined breaking zone.
3. Rinse the needle and the plunger by taking approx. 0.5 mL standard into the syringe. Avoid taking any air into the syringe.
4. Discard rinsing solution. Do not pull plunger up and down. Afterwards, wipe the needle dry.
5. Draw the rest of the standard immediately into the syringe. Leave a few drops in the ampoule.
6. Remove any possible air bubble from syringe and wipe the needle dry.
7. Add an aliquot of standard (at least 1 mL) by back-weighing to the titration vessel and carry out the titration.
8. Remove a few drops of standard from the tip of the syringe before further use and wipe the needle dry again.
9. Repeat steps 7-8.

The amount of one ampoule is dedicated for rinsing the syringe followed by a triple determination of the water content.

The recovery rate should ideally be within the expanded measurement uncertainty stated on the Report of Analysis provided with each pack. However, it is also acceptable to follow the guidelines mentioned in literature, such as the European Pharmacopoeia:

- For 10.0 mg water: max. ± 0.2 mg ($\pm 2\%$ or 10.0 mg/g ± 0.2 mg/g or 1.00% $\pm 0.02\%$)
- For 1000 μ g water: max. ± 25 μ g ($\pm 2.5\%$ or 1.000 mg/g ± 0.025 mg/g or 1000 ppm ± 25 ppm)
- For 100 μ g water: max. ± 10 μ g ($\pm 10\%$ or 0.100 mg/g ± 0.010 mg/g or 100 ppm ± 10 ppm)

Syringes and needles recommended for liquid water standards in ampoules:

Glass gas-tight syringes:



HAMILTON 5 mL, Model 1005 TLL SYR
PTFE Luer Lock (TLL)
Part Number/REF: 81520



HAMILTON 10 mL, Model 1010 TLL SYR
PTFE Luer Lock (TLL)
Part Number/REF: 81620

Metal Hub Needles with custom length (HAMILTON):

Part Number/REF: 7748-07 120 mm / point 4 / gauge 21 (inner diameter approx. 0.51 mm)
Part Number/REF: 7748-06 120 mm / point 4 / gauge 20 (inner diameter approx. 0.60 mm)

For viscous samples (e.g. HYDRANAL-Water Standard Oil):


Part Number/REF: 7748-02 120 mm / point 4 / gauge 16 (inner diameter approx. 1.19 mm)

For very viscous samples:

Part Number/REF: 7749-03 120 mm / point 4 / gauge 12 (inner diameter approx. 2.16 mm)


Point Styles

Point 2 

Point 3 

Point 4 

Point 5 

Point AS 

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Water Standards:

[34849 HYDRANAL-Water Standard 10.0](#)
[34425 HYDRANAL-CRM Water Standard 10.0](#)
[34828 HYDRANAL-Water Standard 1.0](#)
[34426 HYDRANAL-CRM Water Standard 1.0](#)
[34446 HYDRANAL-Water Standard 0.1 PC](#)
[34694 HYDRANAL-Water Standard Oil](#)

Note:

Instead of gas-tight glass syringes, using fresh plastic syringes is also acceptable. However, the water standard is less stable in plastic syringes and should be used within approximately 15 minutes.