

HYDRANAL™ Certified Reference Materials (CRMs) and Water Standards for Karl Fischer Titration

Quality management plays an important role in Karl Fischer (KF) titration. Calibration, validation and inspection of analytical instruments and reagents is performed by using known amounts of water, either pure water or water present in standard materials. The challenge with pure water is the low amount required (e.g. 1–50 mg for volumetry, and 0.1–1 mg for coulometry), which is difficult to weigh and handle accurately. Those problems can be easily overcome by using water standards, available in both liquid and solid forms.



Liquid Hydranal Water Standards consist of a solvent mixture with specific composition and precisely determined water content. They are packed under argon in easy to open (pre-notched), single use ampoules. Thanks to low water concentration, the required amount handled for one determination is increased from milli-grams to grams, providing higher reliability compared to the use of pure water. Liquid standards are freely mixable with the common KF solvent systems and therefore can be used easily for titer determination, general system checks or for verification of the results between individual samples.

Solid Hydranal Water Standards are packed in amber glass bottles. Defined levels of chemically bound water are available based on sodium tartare dihydrate, lactose monohydrate or potassium citrate monohydrate. Beside direct use, these standards are dedicated for the control of indirect KF oven systems.

General Advantages of HYDRANAL Water Standards and CRMs:

- Broad product range for volumetric and coulometric KF titration, as well as the indirect oven application
- Manufactured according to current ISO requirements
- Verified against external standards such as NIST SRM 2890 or NMIJ CRM 4222
- Long shelf life
- Convenient packaging with detailed instruction for use
- Documentation of Analysis showing the exact water content and expiry date provided with each package



HYDRANAL CRM Water Standards

Highest level of quality and accuracy is getting more and more important for many end users. This change, which is driven by regulatory authorities, is forcing many laboratories to acquire ISO/IEC 17025 accreditation. To help laboratories meet this requirement and obtain highly accurate measurements and traceability in their results, lab managers can now turn to Honeywell's product line of Hydranal **Certified Reference Materials (CRMs)**.

Serving as a reference point, Hydranal CRMs, are produced and certified under combined **ISO 17034** and **ISO/IEC 17025** requirements. This double accreditation, obtained by Hydranal Laboratory in 2014, is proving the highest quality for a producer of certified reference materials.

To meet the requirement of CRMs being traceable to SI units and/or high purity materials of well-established content, Hydranal CRMs are verified against high purity water at a specific weight. Additionally, they are verified against internationally accepted standards from national metrological institutions, such as NIST SRM 2890 and/or NMIJ CRM 4222. Moreover, detailed homogeneity and stability studies are performed. Hydranal CRMs have a well-defined mass fraction and highly accurate measurement of uncertainty which can be found in the Certificate of Analysis (CoA).

CRM Certificate of Analysis:

Comprehensive documentation on:

- Composition
- Intended use
- Storage and handling
- Minimum sample weight
- Production date
- Expiry date
- Exact water content
- Expanded uncertainty

Plus, general information on:

- Production
- Assignment of property value
- Homogeneity study
- Stability study
- Uncertainty estimation

Features	HYDRANAL CRM Water Standards	HYDRANAL Water Standards
Production process monitored according to ISO 17034	✓	
Quality control according to ISO/IEC 17025	✓	✓
Verification against external Reference Material (NIST SRM 2890 or NMIJ CRM 4222)	✓	✓
Traceability (either directly to SI unit or to high purity materials)	✓	✓
Lot-related homogeneity studies	✓	
Lot-related stability studies	✓	
Certificate of Analysis	✓	
Report of Analysis		✓

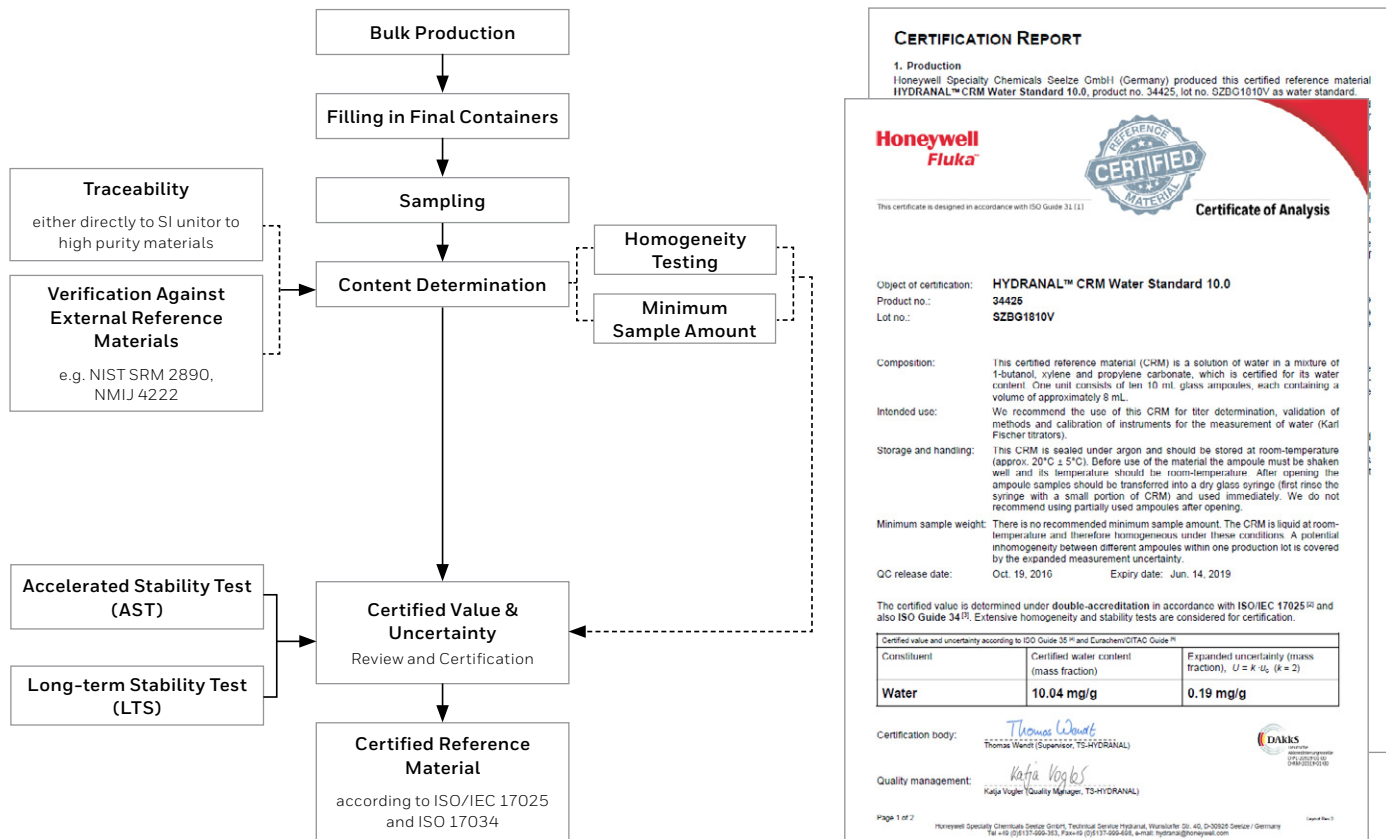


Fig. 1. General flowchart for the certification process of Hydranal CRMs and example documentation

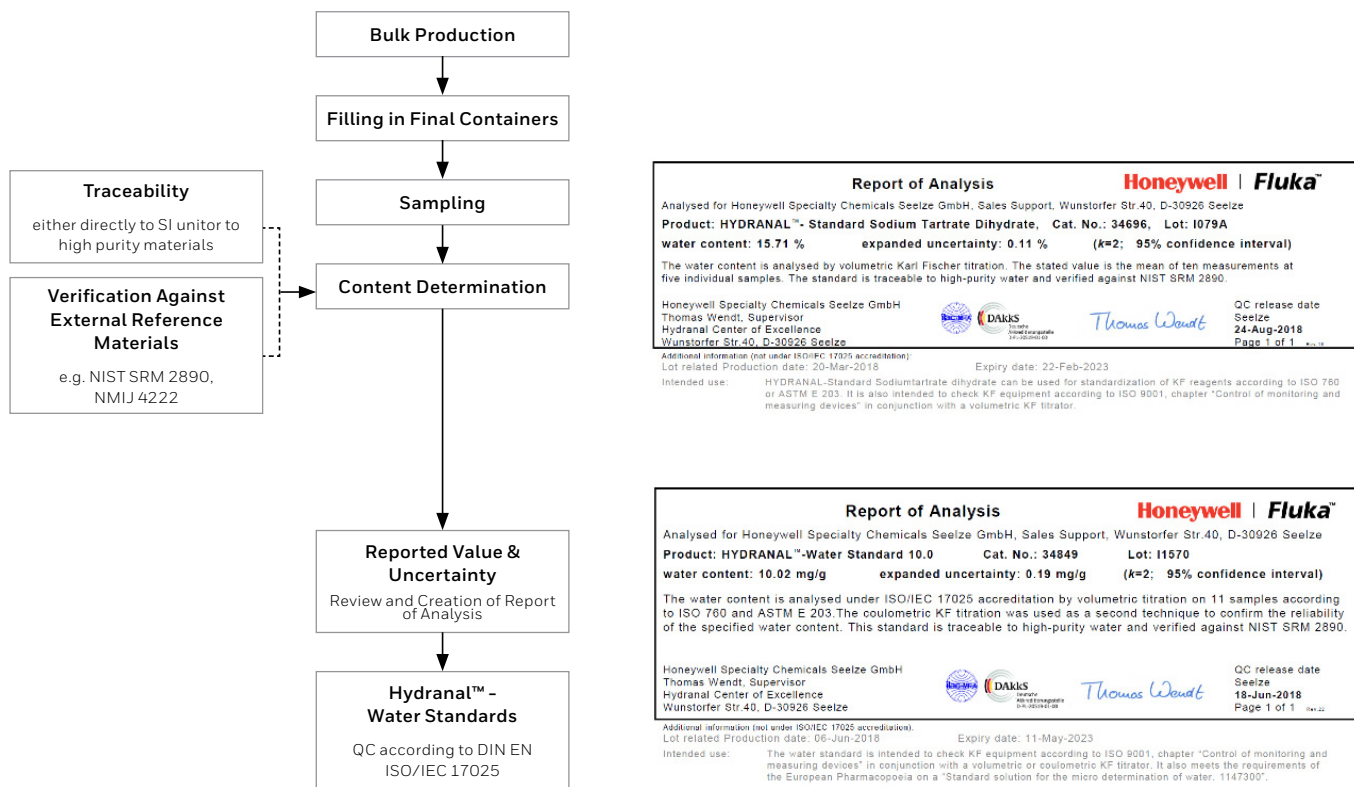


Fig. 2. General flowchart for the process of Hydranal Water Standard and example documentations

Product Number	Product Name	Description	Packaging
34425	HYDRANAL-CRM Water Standard 10.0	Liquid CRM standard, water content 10.0 mg/g = 1.0%	10 x 8 mL
34426	HYDRANAL-CRM Water Standard 1.0	Liquid CRM standard, water content 1.0 mg/g = 0.1%	10 x 4 mL
34424	HYDRANAL-CRM Sodium Tartrate Dihydrate	Solid CRM standard, water content ~15.66%	10 g
34849	HYDRANAL-Water Standard 10.0	Liquid standard, water content 10.0 mg/g = 1.0%	10 x 8 mL
34828	HYDRANAL-Water Standard 1.0	Liquid standard, water content 1.0 mg/g = 0.1%	10 x 4 mL
34847	HYDRANAL-Water Standard 0.1	Liquid standard, water content 0.1 mg/g = 0.01% (shelf life 2 years, to be stored at 2-8°C)	10 x 4 mL
34446	HYDRANAL-Water Standard 0.1 PC	Liquid standard water content 0.1 mg/g = 0.01% (improved stability compared to 34847: shelf life 5 years, to be stored at room temp.)	10 x 4 mL
34694	HYDRANAL-Water Standard Oil	Liquid standard based on mineral oil, water content approx. 10 ppm (0.001%)	10 x 8 mL
34696	HYDRANAL-Standard Sodium Tartrate Dihydrate	Solid standard, water content ~15.66%	25 g
34693	HYDRANAL-Water Standard KF Oven 140-160°C	Solid standard for control of Karl Fischer ovens, water content ~5%, based on lactose	10 g
34748	HYDRANAL-Water Standard KF Oven 220-230°C	Solid standard for control of Karl Fischer ovens, water content ~5.55%, based on potassium citrate	10 g

To learn more about Hydranal, visit

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HYD-DIS-001-0006-ENG | 02/19

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