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GBW13120

## Certificate of Certified Reference Material

KCl Electrolytic Conductivity (Solid Form)

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**Sample Number:**

**Date of Certification:**

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## 1. Description of Material & Intended Use

This Certified Reference Material (CRM), used as aqueous solution, is mainly intended for verification and calibration of conductivity meters, resistance meters, salinity meters based on the principle of conductivity measurement and total dissolved solids (TDS) meters and for the determination of the conductivity cell constant.

## 2. Preparation

Candidate KCl, with high purity and eligible physical and chemical indexes, was subdivided into the packaging units, in which the content of KCl determined with high precision coulometric titration method is more than 99.95%.

## 3. Traceability and certification

As first-class certified reference materials, the certified value can be traceable to the national primary standard on conductivity of China.

Put the aqueous solution of the CRM prepared in accordance with the relevant standard procedures into the JONES conductivity cell with the known constant  $K_{cell}$  (which can be traceable to the recommended value of OIML). Using the following formula and the value of  $R$ , resistance value determined with AC Bridge between the two electrodes of the conductivity cell in temperature balance, the certified value of conductivity  $\kappa$  at the constant measurement temperature  $T$  can be reached:

$$\kappa = \frac{K_{cell}}{R}$$

## 4. Certified values and uncertainties

The certified values of the electrolytic conductivity solutions at different temperatures are as follows:

Primary solution gKCl/1kg solution (in vacuum)	Conductivity* (S.cm <sup>-1</sup> )				
	15°C	18°C	20°C	25°C	35°C
71.1352	0.09212	0.09779	0.10165	0.11133	0.13110
7.41913	0.010455	0.011163	0.011644	0.012852	0.015353
0.745263	0.0011414	0.0012200	0.0012737	0.0014085	0.0016876
0.074526	0.0001185	0.0001267	0.0001322	0.0001465	0.0001765

\*: The conductivity of the deionized water, used in the solution preparation process, is not included in the certified value of conductivity listed in the table.

The relative expanded uncertainty of the certified values is 0.1% with the coverage factor  $k=2$ .

Contributions from measurement uncertainty of the national primary standard on conductivity, measurement repeatability, homogeneity and stability were considered in uncertainty evaluation of the

reference material.

## 5. Homogeneity and Stability Testing

According to the requirement of national criterion for primary certified reference materials, the within-bottle and between-bottle homogeneity and stability testing for this reference material were carried out through random sampling by relative measurement method with high-precision conductivity meter.

The *F*-test method was used for homogeneity testing and no statistically significant difference among bottles was observed. The reference material is in good homogeneity. Random sampling at regular intervals was made to test the stability of this reference material. There is no statistically significant difference among the values in 15 years since first certification. The reference material is well stable.

The period of validity of this CRM is 5 years from the date of certification. The stability of this RM is regularly monitored by NIM. Any change of the certified value during this period will be informed to the customers in time.

## 6. Instructions for use

- The minimum packaging amount is 15 g. And it should be stored at cool and dry place.
- This material, which has been dehydrated at 500°C for four hours, must be prepared into solution in accordance with the standard operating procedures recommended before use. The conductivity of the deionized water, used in the solution preparation process, should be less than 1.2μS/cm at 25°C. While Weighing, buoyancy correction must be done and the density of potassium chloride solid is 1.984 g/cm<sup>3</sup>.
- As the temperature coefficient of the KCl solution's conductivity is about +2%·°C<sup>-1</sup>, it must be measured under the conditions with constant temperature. The uncertainty of temperature controlled depends on the requirement of the uncertainty of measurement result.

- The formula for  $K_{cell}$ , the constant of conductivity cell, is 
$$K_{cell} = \frac{\kappa}{G}$$

In which,  $\kappa$  is the conductivity value of the KCl solution prepared with this certified reference materials,

And  $G$  is the conductance value between the two electrodes of the cell.

## STATEMENT

1. The CRM is limited to the use of scientific research and analytical measurement. NIM is not responsible for any loss caused by improper use and storage of the CRM by the customer. Any compensate can only cover CRM itself.
2. Please check the status of reference materials as soon as the sample arriving. The certificate is only valid with the whole file and special stamp for NIM RM distribution. Please keep the integrality of the certificate.
3. If more information related to the use of the CRM is needed, please contact the technical enquiries section.