

▪ **Certificate of Analysis** ▪

Product: WatR™ Supply Hardness
Catalog Number: 693
Lot No. S230-693
Certificate Issue Date: January 13, 2016
Expiration Date: June 30, 2019
Revision Number: Original

CERTIFICATION

Parameter	Certified Value ¹	Uncertainty ²	QC Performance Acceptance Limits ³	PT Performance Acceptance Limits ⁴
	mg/L	%	mg/L	mg/L
Calcium	32.8	3.11	29.2 - 35.8	27.9 - 37.7
Magnesium	12.6	2.70	11.2 - 14.1	10.7 - 14.5
Sodium	36.8	3.41	32.1 - 41.2	31.3 - 42.3
Calcium Hardness as CaCO ₃	81.8	2.99	73.3 - 89.2	69.5 - 94.1
Total Hardness as CaCO ₃	134	1.90	122 - 143	114 - 154

ANALYTICAL VERIFICATION

Parameter	Certified Value ¹	Proficiency Testing Study			NIST Traceability	
		Mean	Recovery ⁵	n	SRM Number	Recovery
	mg/L	mg/L	%			%
Calcium	32.8	33.0	101	34	3109a	104
Magnesium	12.6	12.6	99.9	32	3131a	102
Sodium	36.8	37.3	101	28	3152a	101
Calcium Hardness as CaCO ₃	81.8	83.2	102	25	3109a	105
Total Hardness as CaCO ₃	134	134	100	38	3109a/3131a	103



A Waters Company

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1. The **Certified Values** are the actual "made-to" concentrations confirmed by ERA analytical verification. The certified values are monitored and purchasers will be notified of any significant changes resulting in recertification or withdrawal of this certified reference material during the period of validity of this certificate.

2. The **Uncertainty** is the total propagated uncertainty at the 95% confidence interval. The uncertainty is based on the preparation and internal analytical verification of the product by ERA, multiplied by a coverage factor. The uncertainty applies to the product as supplied and does not take into account any required or optional dilution and/or preparations the laboratory may perform while using this product.

3. The **QC Performance Acceptance Limits (QC PALs™)** are based on actual historical data collected in ERA's Proficiency Testing program. The QC PALs™ reflect any inherent biases in the methods used to establish the limits and closely approximate a 95% confidence interval of the performance that experienced laboratories should achieve using accepted environmental methods. Use the QC PALs™ to realistically evaluate your performance against your peers.

4. The **PT Performance Acceptance Limits (PT PALs™)** are calculated using the regression equations and fixed acceptance criteria specified in the NELAC proficiency testing requirements. Use the PT PALs™ when analyzing this QC standard alongside USEPA and NELAC compliant PT standards. Please note that many PT study acceptance limits are concentration dependent (some non-linearly) and, therefore, the acceptance limits of this QC standard and any PT standard may differ relative to their difference in concentrations.

5. The **PT Data/Traceability** data include the mean value, percent recovery and number of data points reported by the laboratories in our Proficiency Testing study compared to the Certified Values. In addition, where NIST Standard Reference Materials (SRMs) are available, each analyte has been analytically traced to the NIST SRM listed. This product is traceable to the lot numbers of its starting materials. All gravimetric and volumetric measurements related to its manufacture are traceable to NIST through an unbroken chain of comparisons.

Traceability Recovery (%) = $[(\% \text{ recovery certified standard}) / (\% \text{ recovery NIST SRM})] * 100$

The traceability data shown were compiled by analyzing the ERA standards or their associated stock solutions against the applicable NIST SRMs.

6. For additional information on this product such as intended use, instructions for use, level of homogeneity, and safety information, please refer to the provided Instruction Sheet

If you have any questions or need technical assistance, please call ERA technical assistance at 1-800-372-0122 or send an email to info@eraqc.com.

Certifying Officer

Tom Widera

Quality Officer

David Kilhefner