

# Application Bulletin

## STANDARD SOLUTIONS AND BUFFERS



All Myron L<sup>®</sup> handheld instruments are factory calibrated with NIST traceable Standard Solutions having specific conductivity/ppm values. Myron L<sup>®</sup> Company Standard Solutions are made under strictly controlled conditions using reagent grade salts. These salts are mixed with deionized water having a resistivity of at least 5 megohms-cm purity.

Myron L<sup>®</sup> Company Standard Solutions have an accuracy of  $\pm 1\%$  based on values published in the International Critical Tables and traceable to the National Institute of Standards and Technology.

The conductivity Standard Solutions and pH Buffers listed to the right are used for factory and/or user calibration. Regular use of these solutions is recommended to ensure specified instrument accuracy. Frequency of conductivity recalibration depends upon use, but once every month should be sufficient for an instrument used daily. pH models, depending upon use, should be recalibrated with pH 7 Buffer every 1-2 weeks, and checked with pH 4 and/or 10 Buffers at similar intervals. pH Sensor Storage Solution is recommended for keeping the pH sensor hydrated. Consult the owner's manual of your instrument regarding other indicated solutions. Myron L<sup>®</sup> solutions are available in quart/1 ltr., gallon/3,8 ltr. and 2 oz./59 ml plastic bottles, ready to use. (Custom value standards only offered in gallon/3,8 ltr. size bottles.)

Conductivity instruments are a convenient way to determine the parts per million of total dissolved solids (ppm/TDS) in boilers, cooling towers, reverse osmosis systems, etc. Although the International Unit (SI) of measuring conductivity is the microsiemens/cm (also known as micromhos/cm), a direct reading in ppm/TDS is sometimes preferred.

Myron L<sup>®</sup> conductivity instruments and monitor/controllers are calibrated to read in ppm/442, ppm/NaCl, or microsiemens. All three values are listed on our Standard Solutions. The relationship among these standards can be seen in the table and graphs that follow.

**442 Natural Water™ Standard Solution** is used in calibrating many Myron L<sup>®</sup> Instruments. It is the best choice when measuring boiler and cooling water

INSTRUMENT MODEL	RECOMMENDED STANDARDS / BUFFERS
4P, D-4	KCL-7000, 442-3000, NACL-14.0
6P, D-6	KCL-7000, 442-3000, NACL-14.0, 4, 7 and 10 pH Buffers
512T2 (M2)	442-30
512T3 (M3)	442-300
512T4 (M4)	442-1500
512T5 (M5), 512T5D, AG-5	442-3000
512T10 (M10)	KCL-7000
532M1, 532T1, EP	442-30, 300, 3000
532T2	442-15,150,1500
9PTKB	KCL-7000, 442-3000, NACL-14.0; ALK-100 and HARD-200; 4, 7 and 10 pH Buffers; reagents A1, HB, H4, H5
9PTKA	KCL-7000, 442-3000, NACL-14.0; ALK-100 and HARD-200; 4, 7 and 10 pH Buffers; reagents A1, C1, H1, H2, H3
AG6/PH, M6/PH, T6/PH	442-3000, 4, 7 and 10 pH Buffers
AR1, TP1	KCL-1800, 442-1500
ARH1, TPH1	KCL-1800, 442-1500, 4, 7 and 10 pH Buffers
D-1, D-2	NACL 14.0 Millimhos
DS-1, RO-1 (NC)	442-1000
EP-10	KCL-70, 700, 7000
EP11/PH	KCL-70, 700, 7000, 4, 7 and 10 pH Buffers
PS6 (all)	KCL-7000, 442-3000, NACL-7500, 4, 7 and 10 pH Buffers
PS9TKB	KCL-7000, 442-3000, NACL-7500; ALK-100 and HARD-200; 4, 7 and 10 pH Buffers; reagents A1, HB, H4, H5
PS9TKA	KCL-7000, 442-3000, NACL-7500; ALK-100 and HARD-200; 4, 7 and 10 pH Buffers; reagents A1, C1, H1, H2, H3
PT1, PTBT1	KCL-1800 and 442-3000
PT2, PTBT2, 3P, PH1, TH1	4, 7 and 10 pH Buffers
T2/PH	442-30, 300, 3000, 4, 7 and 10 pH Buffers

**Note:** For information on ORP Conditioner and Calibration solutions, call the Myron L<sup>®</sup> Company.

**Note:** Refer to TDS/Conductivity Equivalents chart for actual calibration point values.

**Note:** RE-10 Range Extenders are usually calibrated with either 442-15,000 or 442-30,000 Standard Solution.

samples, city water supply, lakes, wells, etc. "442" refers to the combination of salts mixed with deionized water to comprise this standard: 40% sodium sulfate, 40% sodium bicarbonate, 20% sodium chloride. A combination of standard salts is necessary since natural water salt type and concentration can vary greatly by location. After much research, the 442™ Standard was developed by the Myron L® Company more than 50 years ago. It remains the world's most accepted standard.

**NaCl Standard Solution** is offered to calibrate instruments that measure any sample that is predominately NaCl (sodium chloride), such as sea water, brackish water, dialysate, etc. As can be seen in the graph that follows, 1000 ppm of NaCl has a conductivity of 2000 micromhos. Note how this 1:2 relationship is continuously variable throughout the curve and decreases as ppm NaCl increases.

**KCl Standard Solution** is used to calibrate conductivity instruments that read directly in microsiemens (micromhos) or millisiemens (1000 microsiemens). KCl (potassium chloride) is a very stable salt and is an international calibration standard for conductivity measurement.

**pH Buffer Solutions 4, 7 and 10** are mold inhibited and accurate to within  $\pm 0.01$  pH units @ 25°C. Myron L® Buffers are traceable to NIST certified pH references and are color-coded for instant identification.

**pH Sensor Storage Solution** is used to prolong the life of a pH/ORP sensor and to enable a faster response to sample measurements. It consists of a pH 4 Buffer and Potassium Chloride mixture. It also contains an anti-microbial compound to inhibit the growth of microbial organisms.

**Reagents, buffers and calibration solutions for alkalinity and hardness titrations, as well as ORP sensor conditioner and calibration solutions are also available. Contact the Myron L® Company for more information.**

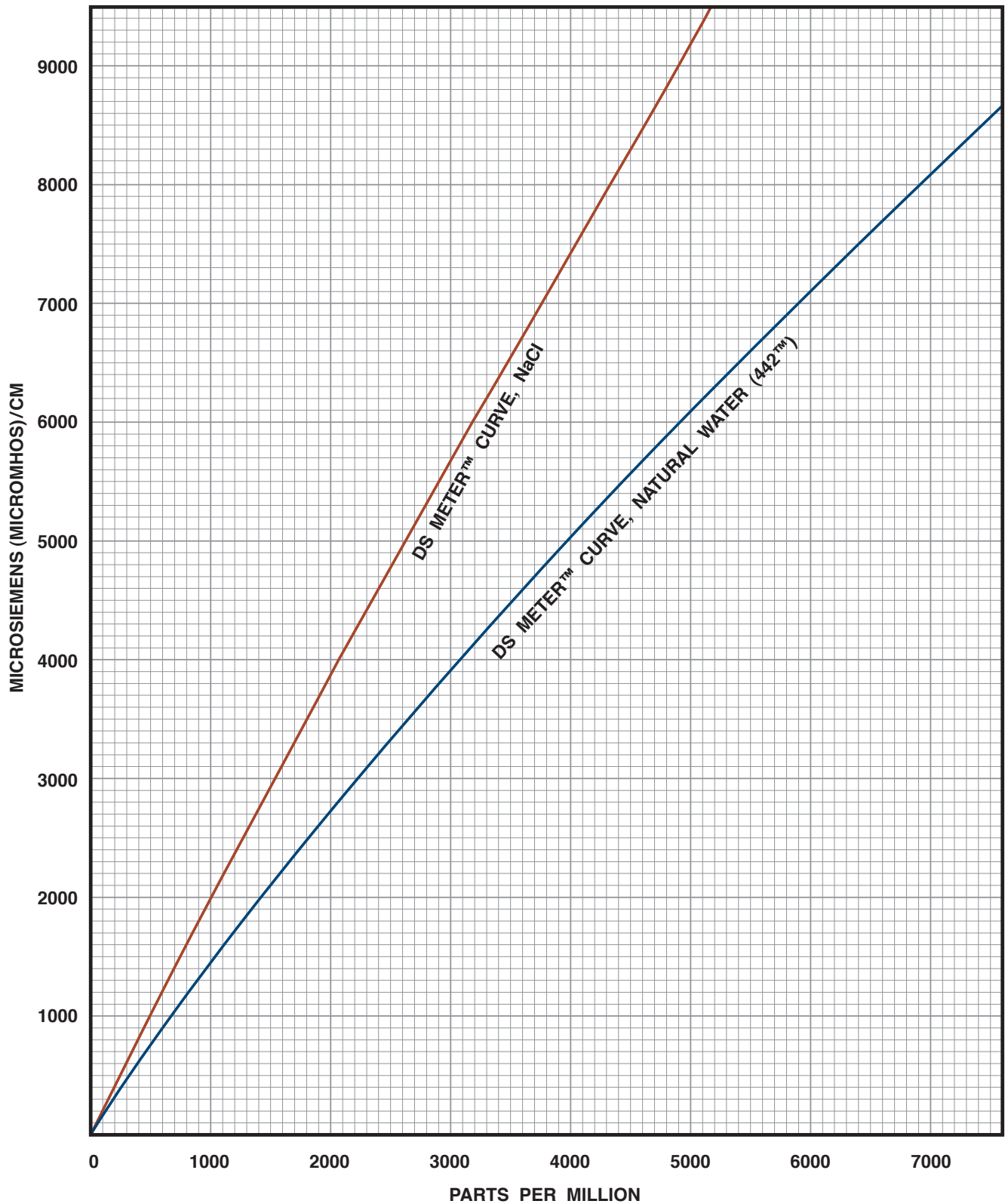
MSDS are available from the Myron L® website here: [myronl.com/main/Material\\_Safety\\_DS\\_DL.htm](http://myronl.com/main/Material_Safety_DS_DL.htm)

The table below lists the Conductivity/TDS equivalent values for Myron L® 442 Natural Water™, NaCl, and KCl conductivity/TDS Standard Solutions.

TYPE	442™	NaCl	KCl
Standard	ppm	ppm	Microsiemens (Micromhos)/cm
442-15	15	11.1	23.8
442-30	30	21.8	46.7
442-150	150	108.7	229
442-300	300	214.3	445
442-500	500	355.8	731
442-1000	1000	703.6	1417
442-1500	1500	1036	2060
442-3000	3000	2027	3900
442-15,000	15,000/15 ppt	9462/9.46 ppt	16,630/16.63 mS
442-30,000	30,000/30 ppt	18,235/18.24 ppt	30,100/30.10 mS
KCl-70	45	32.8	70
KCl-700	478	340.2	700
KCl-7000	5687	3740	7000
KCl-70,000	84,983/84.98 ppt	47,999/48 ppt	70,000/70 mS
KCl-18*	11.4	8.4	18
KCl-180	116.5	85.2	180
KCl-1800	1294	901.6	1800
KCl-18,000	16,462/16.46 ppt	10,289/10.29 ppt	18,000/18.00 mS
NaCl-12.5	10,870/10.87 ppt	6955.7	12,500/12.50 mS
NaCl-13.4	11,767/11.77 ppt	7501.1	13,400/13.40 mS
NaCl-14.0	12,370/12.37 ppt	7864.7	14,000/14.00 mS
NaCl-7500	11,767/11.77 ppt	7501.1	13,400/13.40 mS

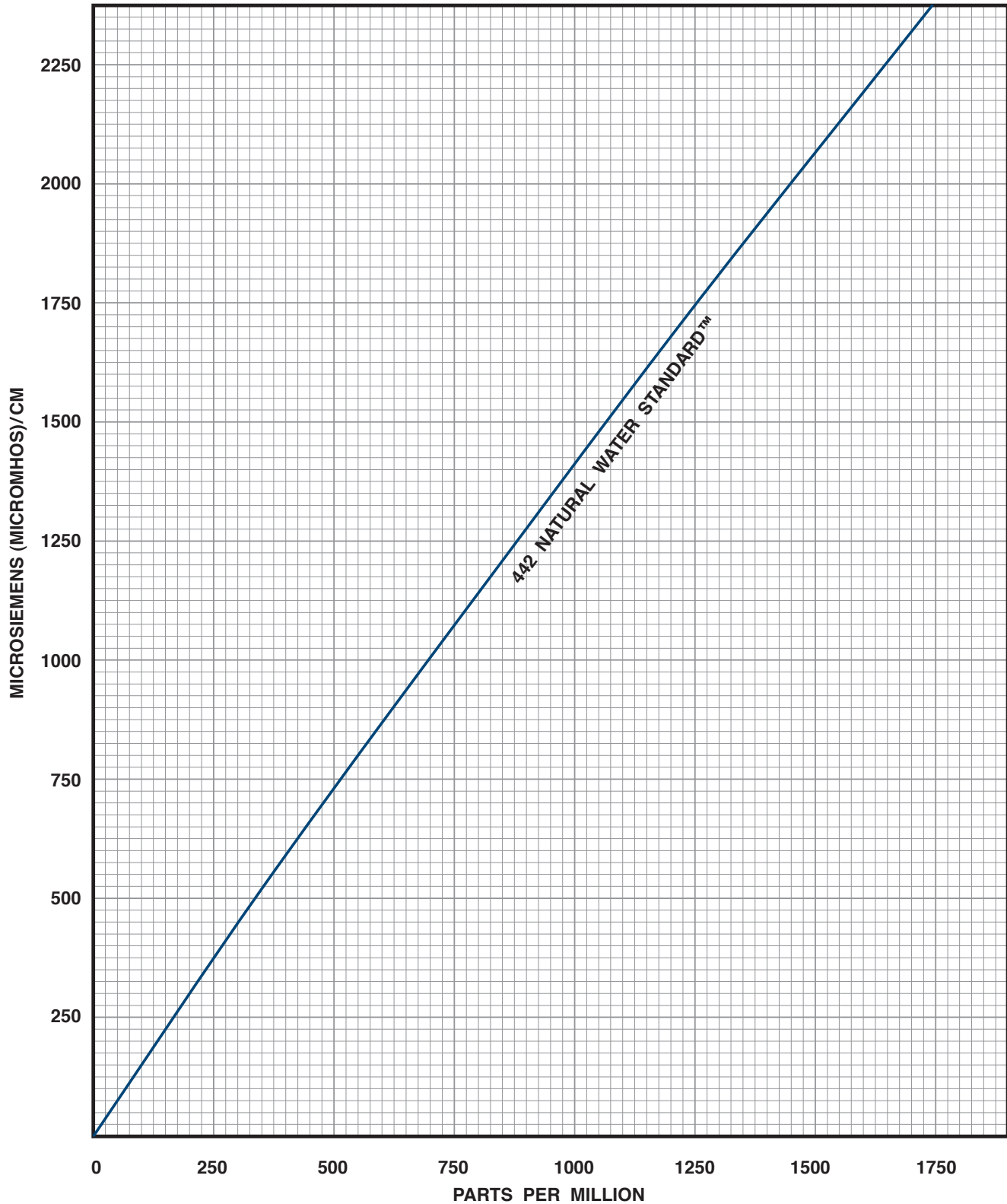
- Notes:**
1. 442™ Standard Solution is the trademark for the Myron L® Company Natural Water Standard.™
  2. All values cross-referenced @ 25°C.
  3. Custom valued Conductivity/TDS Standard Solutions may be special ordered.
  - \*4. Because of environmental factors, accuracy of this solution cannot be guaranteed to destination.
  5. Solutions will freeze @ 0°C/32°F

## TDS / CONDUCTIVITY CONVERSION CHART



**Note:** The 442™ to Conductivity correlation is non-linear and no single multiplier can be used to determine the relationship.

# TDS / CONDUCTIVITY CONVERSION CHART



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**Built On Trust.** Founded in 1957, the Myron L<sup>®</sup> Company is one of the world's leading manufacturers of water quality instruments. Because of our commitment to product improvement, changes in design and specifications are possible. You have our assurance any changes will be guided by our product philosophy: accuracy, reliability, and simplicity.

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