

# Application Bulletin

## STANDARD SOLUTIONS AND BUFFERS



All Myron L handheld instruments are factory calibrated with NIST traceable Standard Solutions having specific conductivity/ppm values. Myron L 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 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 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 wet. Myron L 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

**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.

| INSTRUMENT MODEL       | RECOMMENDED STANDARDS / BUFFERS                       |
|------------------------|---|
| 3P                     | 4, 7 and 10 pH Buffers                                |
| 4P & 4PII              | KCL-7000, 442-3000, NACL-14.0,                        |
| 6P & 6PII              | KCL-7000, 442-3000, NACL-14.0, 4, 7 and 10 pH Buffers |
| PS6 (PoolPRO™)         | KCL-7000, 442-3000, NACL-7500, 4, 7 and 10 pH Buffers |
| PH1/TH1                | 4, 7 and 10 pH Buffers                                |
| AR1/TP1                | KCL-1800, 442-1500                                    |
| ARH1/TPH1              | KCL-1800, 442-1500, 4, 7 and 10 pH Buffers            |
| 512T2 (M2)             | 442-30  |
| 512T3 (M3)             | 442-300   |
| 512T4 (M4)             | 442-1500  |
| 512T5 (M5)             | 442-3000  |
| 512T5D (PoolMeter™)    | 442-3000  |
| 512T10 (M10)           | 442-3000 (KCL-7000)                                   |
| 532M1                  | 442-30, 300, 3000                                     |
| 532T1                  | 442-30, 300, 3000                                     |
| 532T2                  | 442-15,150,1500                                       |
| AG-5 (AgriMeter™)      | 442-3000  |
| AG6/PH (AgriMeter™)    | 442-3000, 4, 7 and 10 pH Buffers                      |
| D-1 (Dialysate Meter™) | NACL 14.0 Millimhos                                   |
| D-2 (Dialysate Meter™) | NACL 14.0 Millimhos                                   |
| DS-1                   | 442-1000  |
| EP                     | 442-30, 300, 3000                                     |
| EP-10                  | KCL-70, 700, 7000                                     |
| EP11/PH                | KCL-70, 700, 7000, 4, 7 and 10 pH Buffers             |
| M6/PH                  | 442-3000, 4, 7 and 10 pH Buffers                      |
| RO-1 (NC)              | 442-1000  |
| T2/PH                  | 442-30, 300, 3000, 4, 7 and 10 pH Buffers             |
| T6/PH                  | 442-3000, 4, 7 and 10 pH Buffers                      |

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 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 Instruments. It is the best choice when measuring boiler and cooling water 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 40 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, etc. As can be seen in the graph at right, 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.

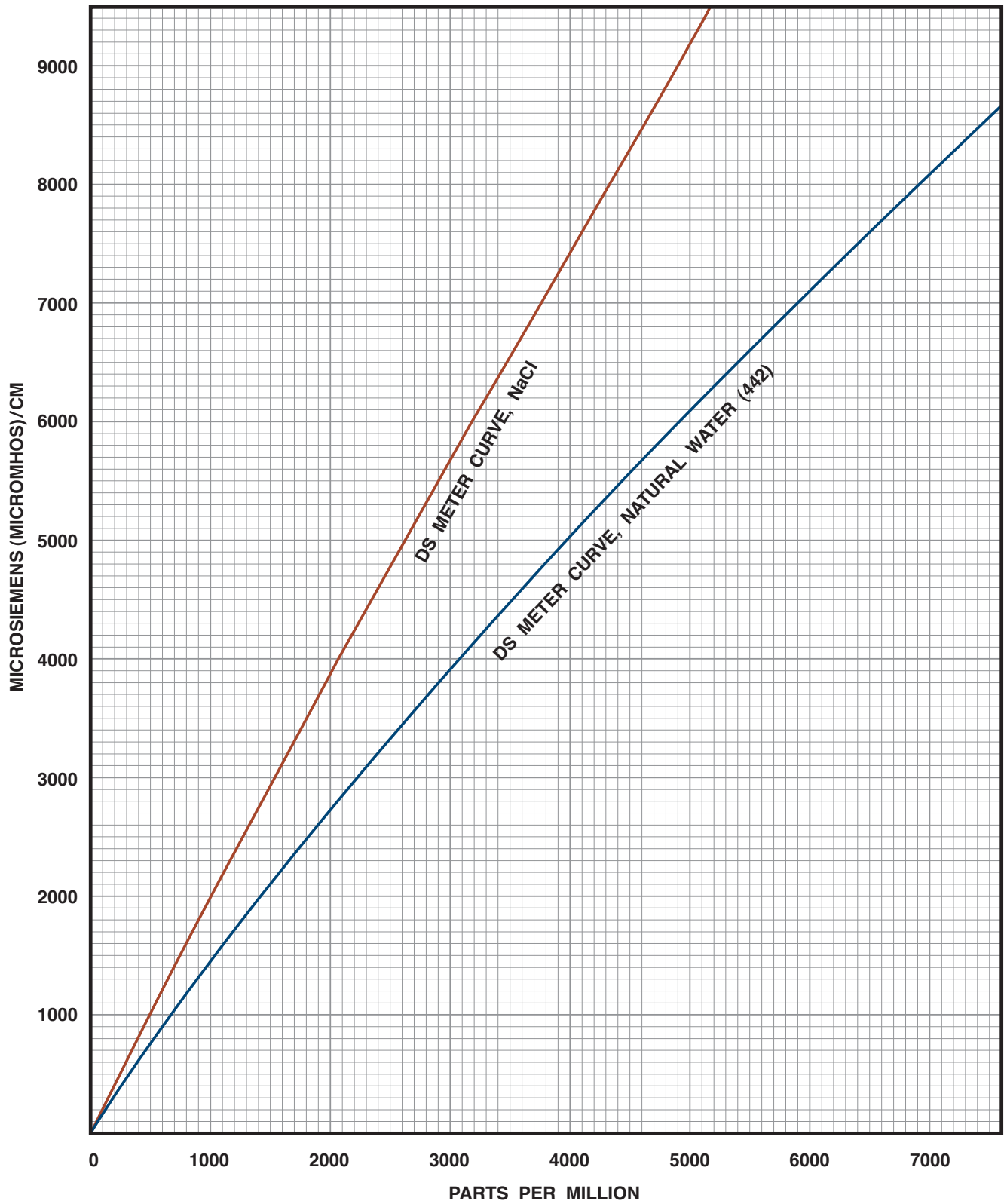
**pH Buffer Solutions 4, 7 and 10** are mold inhibited and accurate to within  $\pm 0.01$  pH units @ 25°C. Myron L Buffers are traceable to NIST certified pH references and are color-coded for instant identification.

The table below shows the Conductivity/TDS Equivalents for various Myron L Standard Solutions.

| TYPE       | 442™             | NaCl             | KCl                         |
|------------|------------------|------------------|-----------------------------|
|            | 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 | 30,100/30.1 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 mS                |
| NaCl-12.5  | 10,870/10.87 ppt | 6955.7           | 12,500/12.5 mS              |
| NaCl-13.4  | 11,767/11.77 ppt | 7501.1           | 13,400/13.4 mS              |
| NaCl-14.0  | 12,370/12.37 ppt | 7864.7           | 14,000/14.0 mS              |
| NaCl-7500  | 11,767/11.77 ppt | 7501.1           | 13,400/13.4 mS              |

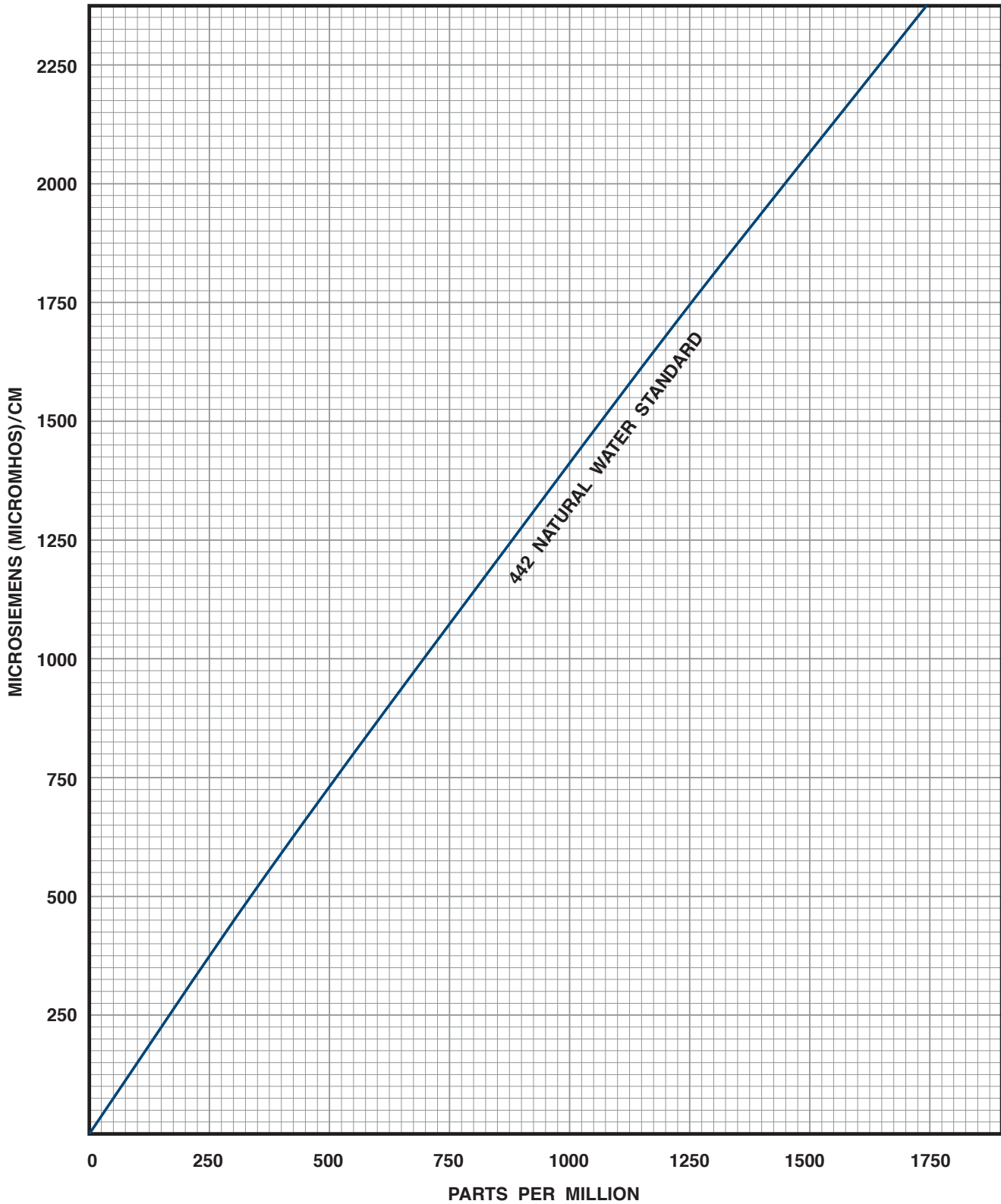
- Notes:**
1. 442™ Standard Solution is the trademark for the Myron L Company Natural Water Standard.™
  2. All values cross-referenced @ 25°C.
  3. Custom valued Conductivity/TDS Standard Solutions may be special ordered.
  - \*4. Because of environmental factors, accuracy of this solution cannot be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



2450 Impala Drive  
Carlsbad, CA 92010-7226 USA  
Tel: +1-760-438-2021  
Fax: +1-800-869-7668 / +1-760-931-9189  
[www.myronl.com](http://www.myronl.com)

Built On Trust. Founded in 1957, the Myron L 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.

