WHY BUY PRIMARY STANDARDS FROM HART?

Setting up a primary temperature standards lab is no small project. Decisions must be made about temperature range, uncertainty requirements, the types of standards you need, and the companies that can supply your standards. Whose products are reliable? Which company backs up its performance claims? Who provides after-sale support and training? Who really demonstrates the most integrity throughout your ownership experience? After all, substantial investments are being made, and in many cases the credibility of your lab can be affected by the outcome.

So why does Hart Scientific claim to be the world's best supplier of primary temperature standards? Because our products have been tested over and over again by national labs around the world and proven to outperform their specs. Because the people who design and build primary temperature standards at Hart have been designing and building primary temperature standards longer than any other supplier in the world. We not only manufacture primary standards, we perform basic research and innovate with new primary standards designs. No other company offers the high-quality training and post-sale support that we do. No one!

Metal Fixed-Point Cells

For realizing the ITS-90 temperature scale, Hart's metal fixed-point cells provide performance you can trust, and we supply the data with each cell to prove it. Hart's fixed-point cells benefit from more than 20 years of experience in research, design, and manufacturing. Three types of cells are available: traditional size cells, "mini" quartz cells, and small stainless steel "X" cells. All three provide outstanding performance.

Every cell undergoes thorough testing in our NVLAP-accredited lab where we realize at least three freezing curves and perform a detailed "slope analysis" to confirm cell purity. This data is supplied with every cell. If you'd like more data, we can also supply comparison data with our own reference cells that have been independently tested at NIST.

No other commercial company has as much experience in the development of fixed-point cells as Hart. Hart's own Xumo Li was a key contributor to the development of the ITS-90 scale. That's one reason you'll find Hart cells in many of the national metrology institutes around the world.

Water Triple Point Cells

Like our metal fixed-point cells, Hart's triple point of water cells come in traditional and mini quartz sizes as well as mini stainless steel, which can be realized in a dry-well calibrator. Our traditional cells have been tested at NIST (see chart on facing page) and are within a few micro-Kelvin of NIST's cells.

If you're new to primary temperature standards and are considering a water triple point cell, one of our cells is sure to meet your requirements. We offer training through our seminars, insurance for our quartz cells, and our stainless steel cell can't be broken!

Maintenance Apparatus

Maintaining fixed-point cells requires high-stability apparatus with tight gradient control so plateaus last longer and your work is more productive. Every Hart maintenance apparatus, including our metrology furnaces and fluid baths, uses temperature controllers designed and manufactured by Hart. These controllers are widely recognized for their

unmatched stability and uniformity control.

For metal fixed-point cells, choose from one-zone, three-zone, or heat-pipe furnaces for regular or mini cells. Optional equilibration blocks fit into the furnaces for annealing and comparison calibrations. Don't let the competition try to tell you that a furnace fitted with process controllers can provide the same performance as a furnace fitted with controllers designed specifically for high-stability temperature control. With a Hart furnace you'll get longer cell plateaus with smaller gradients than you will from any other furnace on the market.

SPRTs

SPRTs are the only acceptable ITS-90 interpolation devices from the triple point of hydrogen (13.8033 K) to the freezing point of silver (961.78°C). While most SPRT manufacturers lost their design capabilities years ago, Hart continues to develop new innovative designs with the lowest drift rates.

Hart manufactures quartz SPRTs in four different temperature ranges, including new capsule SPRTs for low temperatures and a new ultra-stable SPRT for the range –200°C to 450°C. Our metal-sheath SPRTs include a new 25.5-ohm, contamination-resistant SPRT, so you finally have a choice of suppliers. Hart SPRTs are the standards of choice for many national metrology institutes around the world.

Thermometry

Traditionally, SPRT measurements have been made using expensive, difficult-to-use bridges. If you need 1 ppm accuracy, there's nothing that provides a better price/performance ratio than Hart's Model 1590 Super-Thermometer. The 1590 Super-Thermometer provides bridge accuracy at a fraction of the cost and provides a multitude of features that improve your productivity. With a Super-Thermometer, there is virtually no learning curve. It's so easy to use that you'll be making measurements within minutes after switch-on.

Xumo Li, Vice President of Technology Development and Director of Metrology

If you truly need 0.1 ppm performance, the 5581 MIL Bridge offers conventional DC measurement with a wide range. It's perfect for temperature metrology work and for labs looking to combine temperature with electrical resistance standards.

Training

Once you've determined which primary standards products you need and you've made a major investment, what about training and after-sales support? Hart's temperature school offers a set of fun and unique seminars that provide all the answers to your toughest questions. Our 2½-day Realizing and Approximating ITS-90 Seminar and our 4-day ITS-90 Workshop provide all the theory and hands-on experience you need. You'll learn theory from former national lab scientists, and you will do practical realizations with our cal lab manager in Hart's primary standards lab.

We've been making and using primary temperature standards for many years, and we understand the issues you face in your lab. Our own lab is accredited (NVLAP lab code 200348-0) and our uncertainties are among the best in the world. When you buy primary standards, don't compromise the quality of the products, the reputation of your supplier, or the level of service and training they can provide.