

# Mini fixed-point cells



- Lower uncertainties than comparison calibrations
- All ITS-90 fixed points from TPW to copper
- Reduced equipment and annual recalibration costs

If cuteness were reason enough to buy a product, Hart's Mini Fixed-Point Cells would win you over easily. But there's a much better reason to buy them: they give you the least expensive, easiest-to-use fixed-point standards for your lab.

Mini cells eliminate the need for comparison calibrations. Temperatures of fixed-point cells are constant and intrinsic, so only the electrical parameters of the sensor under calibration need to be read. If you're calibrating industrial thermometers, thermocouples, or thermistors and want the most accurate calibration possible, these mini cells will give it to you. If you need a wide range of temperatures, mini cells cover the triple point of water (0.01 °C) and every ITS-90 point from indium (156.5985 °C) to copper (1084.62 °C).

## Fixed-points made simple

With mini cells, realization and maintenance are simple. Mini TPW cells can be automatically realized and maintained in our 9210 Maintenance Apparatus (page 30). Realizing the triple point of water takes only five minutes, but the plateaus last all day.

The realization and maintenance of indium, tin, zinc, and aluminum cells are likewise automated through our 9260 Mini Fixed-Point Cell Furnace (page 34). Work with them at their designated freeze point, or use them at their melting point to simplify the calibration process even further. We published a paper, "The Comparison Between the Freezing Point and Melting Point of Tin," to help you understand and benefit from the easier procedure of using the melting point of your standard.

These mini cells are made from the same materials and with the same procedures as their full-size counterparts. In fact, they can achieve nearly the same uncertainty levels as Hart's traditional fixed-point cells. Probes as short as 229 mm (9 in) work with these cells. The specifications table (at right) gives you the immersion depth and uncertainty for each cell.

In addition to high-accuracy calibrations of RTDs and PRTs, these cells are perfect for validating the accuracy of SPRTs. If you're doing comparison calibrations with SPRTs, then you know the importance of occasionally checking their accuracy between their own recalibrations. Because these cells are easy to use

and maintain, verification checks are simple and convenient.

## Metal-cased cells

Metal-cased cells can also be used in the 9260 maintenance furnace. Because they use stainless steel cases, these cells are easier to use and transport without the same risk of breakage. You'll notice that we have designed the metal cased cells with more immersion depth to give even better uncertainty too!

You'll find these cells easier to use than you expect. You can have a free copy of Xumo Li's paper comparing freeze-point measurements with melting-point measurements, and if you want a high level of training in using metal freeze-point cells, you can attend one of Hart's in-depth training classes held in our lab in Utah.

## Ordering Information

5901B-G	TPW Cell, Mini, Glass Shell
5914A	Mini Quartz Indium Cell
5915A	Mini Quartz Tin Cell
5916A	Mini Quartz Zinc Cell
5917A	Mini Quartz Aluminum Cell
5918A	Mini Quartz Silver Cell
5919A	Mini Quartz Copper Cell
5944	Mini Metal Cased Indium Cell
5945	Mini Metal Cased Tin Cell
5946	Mini Metal Cased Zinc Cell
5947	Mini Metal Cased Aluminum Cell
9210	Mini TPW Maintenance Apparatus (see page 30)
9260	Mini Fixed-Point Furnace (for In, Sn, Zn, Al cells—see page 34)

# Mini fixed-point cells

## Specifications

Model Number	Fixed-Point	Temperature (°C)	Outside Diameter	Inside Diameter	Total Cell Height	Immersion Depth <sup>1</sup>	Uncertainty (mK) k=2	
							Cell Only <sup>2</sup>	Simple Realization <sup>2</sup>
5901B-G	Water T. P.	0.01	30 mm	8 mm	170 mm	117 mm	0.2	0.5
5914A	Indium F. P.	156.5985	43 mm	8 mm	214 mm	140 mm	1.0	2.0
5915A	Tin F. P.	231.928	43 mm	8 mm	214 mm	140 mm	1.4	3.0
5916A	Zinc F. P.	419.527	43 mm	8 mm	214 mm	140 mm	1.6	4.0
5917A	Aluminum F. P.	660.323	43 mm	8 mm	214 mm	140 mm	4.0	10.0
5918A	Silver F. P.	961.78	43 mm	8 mm	214 mm	140 mm	7.0	n/a
5919A	Copper F. P.	1084.62	43 mm	8 mm	214 mm	140 mm	15.0	n/a
5944	Indium F. P.	156.5985	41.3 mm	7.8 mm	222 mm	156 mm	0.7	1.4
5945	Tin F. P.	231.928	41.3 mm	7.8 mm	222 mm	156 mm	0.8	1.6
5946	Zinc F. P.	419.527	41.3 mm	7.8 mm	222 mm	156 mm	1.0	2.0
5947	Aluminum F. P.	660.323	41.3 mm	7.8 mm	222 mm	156 mm	2.0	4.0

<sup>1</sup>Distance from the bottom of the central well to the surface of the pure metal.

<sup>2</sup>"Cell Only" refers to the expanded uncertainty of the cell when realized by traditional methods and maintained using traditional maintenance devices. "Simple Realization" refers to the expanded uncertainty of the cell when realized using practical methods (melting points instead of freezing points or slush ice instead of an ice mantle, for example) and maintained using Hart's 9210 and 9260 mini cell maintenance apparatus.

