

GALLIUM CELL AND MAINTENANCE SYSTEM



The gallium melting point (29.7646°C) is a critical temperature. Thermometers used in life science, environmental monitoring, and many other applications depend on it for accurate calibrations. Lab standards rely on it as an ITS-90 check standard and as a means of measuring drift between calibrations. Hart Scientific now makes it easy to use.

The new Model 9230 Gallium Maintenance System works with Hart's Model 5943 Stainless Steel Gallium Cell to provide melting plateaus that last a week. Not a day. Not a day-and-a-half. One week.

The Model 5943 Stainless Steel Gallium Cell holds a gallium sample that is 99.99999+% pure. The gallium is sealed in

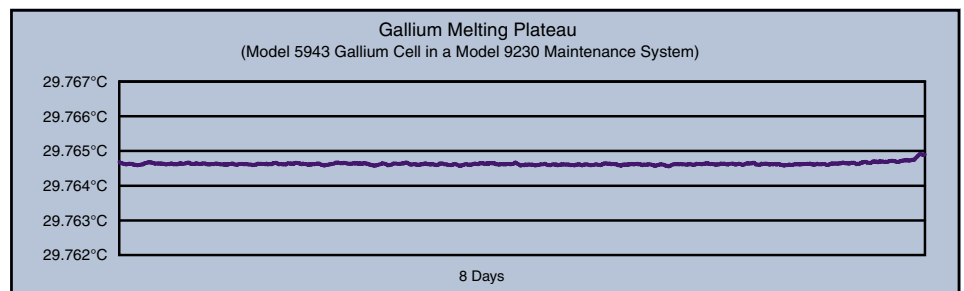
a Teflon envelope in a high purity argon atmosphere, which is itself sealed inside a stainless steel housing. This double-sealing method reduces leaching of the gallium sample and ensures a life of ten years or longer for the cell.

Features Summary

- Maintains gallium melting plateaus for five days or longer
- System uncertainty of 0.08 mK
- Firmware automates melting and refreezing processes
- "Smart" gradient freezes cells from bottom up
- Automated 8-watt heater provides inner melt
- Model 5943 Stainless Steel Gallium Cells are sealed for longer life and easier shipping
- Two pre-heat wells for maximum productivity

The 5943 achieves 29.7646°C with uncertainty of just 0.08 mK and reproducibility of 25 μ K. With the 9230, realizing and maintaining the gallium melting point is fast and easy. Years of training are not required.

When not actively melting or refreezing a gallium cell, the 9230 automatically "rests" at 29.27°C, just below the gallium melting point. To initiate a melt, just insert the attached melt heater into the gallium cell and start the "melt" routine through the 9230's front-panel buttons. The 9230 increases its temperature to just above the gallium point and powers the 8-watt melt heater. Less than 30 minutes later, the gallium cell is ready to be used. Realizing the gallium point requires only a few seconds from the user.



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Because the high quality of the 5943 Gallium Cell is combined with the ultrastable performance of the 9230 Maintenance System, melt plateaus last 5–7 days or longer.

Two preheat wells ensure that thermometers are properly warmed when inserted into the gallium cell. The preheat wells are even oversized so thermometers fit loosely and heat loss from the gallium cell is neither too sudden nor too severe

when cold thermometers are initially placed in the wells.

When the melt plateau is exhausted, the 9230 automates the preparation of the gallium cell for its next melt. After the user initiates the “freeze” routine through the front panel, the 9230 heats to well above the melting point to ensure a complete melt of the entire gallium sample. Then the 9230 automatically cools to refreeze the gallium. Since gallium cells must be frozen from the bottom up (like water,

gallium expands when it freezes), the 9230 induces a 10°C differential during the freezing process to safeguard the cell from damage.

Using a 5943 Gallium Cell, the 9230 delivers uncertainty of $\pm 0.00008^\circ\text{C}$ with virtually no effort from the user. It uses a long-life sealed cell, automates the melting and refreezing processes, and provides plateaus that last a week. Enjoy its convenience and performance in your own lab.

Specifications - 9230

Temperature Range	15°C to 35°C
Ambient Operating Range	18°C to 28°C
Stability	$\pm 0.02^\circ\text{C}$
Melting Plateau Duration	Five days, typical
Vertical Gradient	$< 0.03^\circ\text{C}$ over six inches during cell maintenance
Display Resolution	0.01° (0.001°C in program mode)
Display Scale	°C or °F, switchable
Immersion Depth	6" (152 mm) in gallium cell
Preheat Wells	Two
Fault Protection	Firmware protection
Display Accuracy	$\pm 0.05^\circ\text{C}$ at 29.76°C
Comparison Blocks	Contact Hart
Communications	RS-232 included
Power Requirements	100–230 VAC ($\pm 10\%$), 50–60 Hz, 85 W max.
Exterior Dimensions	8.75" W x 10.25" D x 19.25" H (222 x 260 x 489 mm)
Weight	15 lb. (6.8 kg) without cell



In addition to the 9230 Gallium Maintenance System, Hart's 9210 Triple Point of Water Maintenance System and 9260 Mini Fixed-Point Furnace simplify the use of ITS-90 fixed-point cells. Each offers built-in software for automated realizations and provides uncertainties similar to larger traditional systems.

Specifications - 5943

Expanded Uncertainty (k=2)	± 0.08 mK
Reproducibility	± 0.025 mK
Gallium Purity	99.99999+%
Outside Dimensions	9.85" length x 1.5" diameter (250 x 38 mm)
Well Dimensions	8.7" length x 0.324" diameter (221 x 8.2 mm)
Immersion Depth	6.58" (167 mm) in gallium

Ordering Information

9230	Gallium Cell Maintenance System
5943	Stainless Steel Gallium Cell
1895	Accredited Cell Intercomparison



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