TECHNICAL DATA

9114, 9115A, 9116A Freeze-point furnaces

Key features

- Can establish plateaus that range from 24 to 40 hours or more.
- 9114 This furnace has a range of 100 °C to 680 °C.
  Maintains indium, tin, zinc, and aluminum fixed point cells.
- 9115A Sodium Heat Pipe Furnace, range 550°C to 1000°C. is specifically Maintains aluminum and silver fixed point cells.
- 9116A Sodium Heat Pope Furnace, range of 550 °C to 1100 °C
  Maintains aluminum, silver, or copper fixed point cells.

Product overview: 9114, 9115A, 9116A Freeze-point furnaces

9114

This furnace has a range of 100 °C to 680 °C, which includes the indium, tin, zinc, and aluminum fixed points, all in one furnace.

The 9114 furnace has an inlet for use of clean dry air or inert gas to initiate the supercool of a tin cell. Other furnaces require the user to remove the hot and fragile tin cell from the furnace by hand before cooling. In a Fluke Calibration furnace, you simply turn on your gas, monitor your cell during its supercool, and turn the gas off when the freeze begins.

The 9114 is a three-zone furnace with the best in digital controller technology. Fluke Calibration designs and builds proprietary controllers that have a reputation of being the best in the business. All of our fixed-point furnaces use them to achieve excellent stability and uniformity.

For easy access and visibility, all three zones are controlled from the front of the unit. The primary controller can be set in 0.01 °C increments, and actual temperature is readable to two decimal places.

The freezing and melting process can be automated using eight preset, user- programmable temperature settings. The top and bottom zones are slaved to the primary zone using differential thermocouples. A high-temperature PRT acts as the main control sensor for the best accuracy, sensitivity, and repeatability.

9115A

The 9115A Sodium Heat Pipe Furnace is specifically designed for maintenance of aluminum and silver freeze-point cells.

It has a temperature range of 550 °C to 1000 °C with gradients of less than ± 0.1 °C throughout. The sodium heat-pipe design provides a simple, yet uniform, single heating zone that ensures very uniform changes in states during heating and cooling.

Melting, freeze initiation, and plateau control for a variety of freeze-point cells are possible by entering up to eight set-points, ramp rates, and soak times. The controller displays temperature in degrees C or F, and temperature feedback is done via a thermocouple. Freeze-point plateaus of 8 to 10 hours are typical, and 24 hours are possible under controlled conditions.

External cooling coils are included for circulation of tap water to reduce chassis temperature and heat load to the lab. Temperature cutouts protect your SPRTs and the furnace from exposure to excessive temperatures.

9116A

The 9116A Furnace has a temperature range of 550 °C to 1100 °C and is designed for use in achieving aluminum, silver, or copper freezing point measurements. An advanced high temperature Sodium heat pipe extends usage to more than 1000 hours at 1100 °C and 5000 hours at 982 °C. The heater is embedded in a fiber ceramic insulating block. A hollow section through the center contains the heat pipe.

The minimum working temperature of the Sodium heat pipe is about 500 °C. Above that temperature, the sodium circulates throughout the tube providing a uniform temperature zone for freezing point measurements. With uniformity of ± 0.05 °C, zone adjustments are eliminated simplifying installation and increasing throughput.

The uniform temperature is maintained over the full length of the metal freeze point cell. A programmable temperature controller simplifies freeze initiation, melting and plateau control. Control stability is ± 0.15 °C, the best in the industry, enabling extension of freezing plateaus of quality fixed point cells for up to 20 hours and longer. For compatibility with automation programs, plateaus may be controlled through standard RS-232 and optional IEEE-488 PC interfaces.

Specifications: 9114, 9115A, 9116A Freeze-point furnaces

Specifications	9114	9115A	9116A
Temperature Range	100 °C to 680 °C	550 °C to 1000 °C	550 °C to 1100 °C

Temperature Stability	±0.03 °C	±0.25 °C	±0.5 °C
Temperature Uniformity	±0.05 °C (±0.1 °C in the pre-heat well)	+0.1 °C	±0.05 °C
Set-Point Accuracy	±0.5 °C	±3.0 °C	
Set-Point Resolution	0.01 °C	0.1 °C	
Display Resolution	0.01 °C	0.1 °C below 1000 °C 1 °C above 1000 °C	
Thermal Safety Cutout Accuracy	±5 °C	±10 °C	
Heater Power	End Zones: 1000 W each (at 230 VAC nominal) Primary Zone: 1500 W	2500 W	
Exterior Dimensions (HxWxD)	838 x 610 x 406 mm (33 x 24 x 16 in)		
Power Requirements	230 VAC (±10 %), 50/60 Hz, 1 Phase, 22 A maximum		
Weight	92 kg (203 lb.)	82 kg (180 lb.)	

Ordering information

9114

Metrology Furnace, 100 °C to 680 °C (includes Cell Support Container)

9115A

Sodium Heat Pipe Furnace, 550 °C to 1000 °C (includes Cell Support Container)

9116A

Sodium Heat Pipe Furnace, 550 °C TO 1100 °C (includes Cell Support Container)

2125

IEEE-488 Interface, 2100

2126

Comparison Block, 9114

2127-9114

Alumina Block, 9114

2127-CB

Alumina Block, 9115A / 9116A

2940-9114

Cell Support Container, 9114

2940-QC

Freeze Point Cell Container, Quartz

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