9190A Ultra-Cool Field Metrology Well

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Highlights

Ultra-cool dry-block calibrator with best-in-class stability

The Fluke Calibration 9190A Ultra-Cool Field Metrology Well is the most accurate and stable, cold temperature dry-block on the market. It’s ideal for applications that demand strict quality control and regulatory process compliance. These applications include on-location validation and calibration of RTDs, thermocouples, thermometers, and sensors used with process control equipment such as medical freezers, laboratory refrigerators, cold rooms, blood banks, sterilizers (autoclaves), and freeze dryers.

Wide temperature range

–95 °C to 140 °C

Excellent accuracy

Accuracy using built-in reference thermometer readout: ± 0.05 °C full range

Display accuracy: ± 0.2 °C full range

Best-in-class stability

± 0.015 °C full range

Fast cooling time

23 °C to –90 °C: 80 minutes

23 °C to –95 °C: 90 minutes

140 °C to 23 °C: 60 minutes

Portability

Weighs only 16 kg (35 lbs)

Built-in front and back handles for easy two-handed carry

Best measurement practices

Conforms with EURAMET cg-13 guidance on measurement practices for temperature calibrators

Description

Great for clean room environments

Calibration baths are the most stable and uniform temperature sources available, but they aren’t a good fit for clean rooms. The size of a bath limits its portability, and bath fluids can easily spill and give off vapors. The 9190A Ultra-Cool Field Metrology Well is a great alternative. Its wide temperature range brackets the coldest and highest temperature ranges required for pharmaceutical, biomedical and food processing applications. The 9190A is small and lightweight, making it easy to transport. And since it does not use heat transfer fluids, clean rooms stay clean. The 9190A cooling and heating times are faster than a calibration bath—that means calibration work gets done more quickly.

An accurate temperature source is critical for dependable process measurements

Unreliable process measurements can have a damaging impact on business, leading to poor product quality, recalls, fines, waste, and lost profits. Ultimately, measurements are only as good as the temperature sources used to calibrate the measurement equipment. The 9190A Ultra-Cool Field Metrology Well incorporates the best technology and design expertise gained from decades of dry-block development experience. The 9190A conforms with EURAMET cg-13 guidelines for best measurement practices for temperature block calibrators. As a result, you can be assured that the 9190A specifications for accuracy, stability, axial (vertical) uniformity, radial (well-to-well) uniformity, loading, and hysteresis have been thoroughly and carefully defined and tested. With a 9190A Ultra-Cool Field Metrology Well, you can be confident you're using the most accurate and stable ultra-cool dry-block calibrator available. And that will have a positive impact on your business.

Specifications

Base unit specifications	
Temperature range at 23 °C	–95 °C to 140 °C (–139 °F to 284 °F)
Display accuracy	± 0.2 °C full range
Accuracy with external reference [3]	± 0.05 °C full range
Stability	± 0.015 °C full range
Axial uniformity at 40 mm (1.6 in)	± 0.05 °C full range
Radial gradient	±0.01 °C full range
Loading effect	(with a 6.35 mm reference probe and three 6.35 mm probes)
	± 0.006 °C full range
	(versus display with one 6.35 mm probe)
	± 0.25 °C at –95 °C
	± 0.10 °C at 140 °C
Operating conditions	0 °C to 35 °C, 0 % to 90 %
	RH (non-condensing) < 2000 m altitude
Environmental conditions for all specifications except temperature range	13 °C to 33 °C
Immersion (well) depth	160 mm (6.3 in)
Well diameter	30 mm (1.18 in)
Heating time [1]	–95 °C to 140 °C: 40 min
Cooling time [1]	23 °C to –90 °C: 80 min
	23 °C to –95 °C: 90 min
	140 °C to 23 °C: 60 min
Stabilization time [2]	15 min
Resolution	0.01 °
Display	LCD, °C or °F user selectable
Size (H x W x D)	380 mm x 205 mm x 480 mm (14.9 in x 8.0 in x 18.8 in)
Weight	16 kg (35 lb)
Power requirements	100 V to 115 V (± 10 %) 50/60 Hz, 575 W
	200 V to 230 V (± 10 %) 50/60 Hz, 575 W

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System fuse ratings	115 V: 6.3 A T 250 V
	230 V: 3.15 A T 250 V
4–20 mA Fuse (-P model only)	50 mA F 250 V
Computer interface	RS-232, USB Serial, and 9930 interface-it temperature calibration software included
Safety	IEC 61010-1, Installation Category II, Pollution degree 2
Electromagnetic environment	IEC 61326-1: Basic
Refrigerants	R32 (Difluoromethane)
	< 20 g, ASHRAE safety group A2L
	R704 (Helium)
	< 20 g, ASHRAE safety group A1
-P Specifications	
Built-in reference thermometer readout accuracy (4-wire reference probe) [3]	± 0.010 °C at –95 °C
	± 0.013 °C at –25 °C
	± 0.015 °C at 0 °C
	± 0.020 °C at 50 °C
	± 0.025 °C at 140 °C
Reference resistance range	0 Ω to 400 Ω
Reference resistance accuracy [4]	0 Ω to 42 Ω: ± 0.0025 Ω 42 Ω to 400 Ω: ± 60 ppm of reading
Reference characterizations	ITS-90, CVD, IEC-751, resistance
Reference measurement capability	4 wire
Reference probe connection	6-pin din with INFO-CON technology
Built-in RTD thermometer readout accuracy	NI-120: ± 0.015 °C at 0 °C
	PT-100 (385): ± 0.02 °C at 0 °C
	PT-100 (3926): ± 0.02 °C at 0 °C
	PT-100 (JIS): ± 0.02 °C at 0 °C
RTD resistance range	0 Ω to 400 Ω
Resistance accuracy [4]	0 Ω to 25 Ω: ± 0.002 Ω
	25 Ω to 400 Ω: ± 80 ppm of reading
RTD characterizations	PT-100 (385), (JIS), (3926), NI-120, resistance
RTD measurement capability	2-wire, 3-wire, and 4-wire RTD with jumpers only
RTD connection	4-terminal input
Built-in TC thermometer readout accuracy [5]	Type J: ± 0.70 °C at 140 °C
	Type K: ± 0.75 °C at 140 °C
	Type T: ± 0.60 °C at 140 °C
	Type E: ± 0.60 °C at 140 °C
	Type R: ± 1.60 °C at 140 °C
	Type S: ± 1.60 °C at 140 °C
	Type M: ± 0.65 °C at 140 °C
	Type L: ± 0.65 °C at 140 °C

	Type U: ± 0.70 °C at 140 °C
	Type N: ± 0.75 °C at 140 °C
	Type C: ± 1.00 °C at 140 °C
TC millivolt range	–10 mV to 75 mV
Voltage accuracy	0.025 % of reading +0.01 mV
Internal cold junction compensation accuracy	± 0.35 °C (ambient of 13 °C to 33 °C)
TC connection	Miniature connectors (ASTM E1684)
Built-in mA readout accuracy	0.02 % of reading + 0.002 mA
mA range	Cal 4-22 mA, Spec 4-24 mA
mA connection	2 terminal input
Loop power function	24 V dc loop power
Built-in electronics temperature coefficient (0 °C to 13 °C, 33 °C to 50 °C)	± 0.005 % of range per °C

Notes:
[1] For ambient temperature of 23 °C.
[2] Time from when the SETPOINT is reached to when the unit is with in stability specification.
[3] The temperature range may be limited by the reference probe connected to the readout.
The built-in reference accuracy does not include the sensor probe accuracy. It does not include the probe uncertainty or probe characterization errors.
[4] Measurement accuracy specifications apply within the operating range and assume 4 wires for PRTs. With 3-wire RTDs add 0.05 Ωto the measurement accuracy plus the maximum possible difference between the resistances of the lead wires.
[5] The thermocouple input readout is sensitive to EM fields in the frequency range of 500 MHz to 700 MHz.

Models and Accessories

<table>
<tr><th>Model Name</th><th>Description</th></tr>
<tr><td>9190A-X</td><td>Ultra-Cool Field Metrology Well, –95 °C to 140 °C, w/9190-INSX
"X" in the model number to be replaced with A, B, C, D, E, and F as appropriate for the desired insert.
<table>
<tr><th>Accessory</th><th>Description</th></tr>
<tr><td>9190-INSA</td><td>Insert "A" 9190A, imperial miscellaneous holes</td></tr>
<tr><td>9190-INSB</td><td>Insert "B" 9190A, imperial comparison holes</td></tr>
<tr><td>9190-INSC</td><td>Insert "C" 9190A, 0.25 inch holes</td></tr>
<tr><td>9190-INSD</td><td>Insert "D" 9190A, metric comparison holes</td></tr>
<tr><td>9190-INSE</td><td>Insert "E" 9190A, metric miscellaneous holes with 0.25 inch hole</td></tr>
<tr><td>9190-INSF</td><td>Insert "F" 9190A, metric comparison miscellaneous holes with 0.25 inch hole</td></tr>
<tr><td>9190-INSZ</td><td>Insert “Z” 9190, blank</td></tr>
</table></td></tr>
<tr><td></td><td>Ultra-Cool Field Metrology Well, –95 °C to 140 °C, w/9190-INSX, with Process Electronics</td></tr>
</table>

<table>
<tr>
<td>9190A-X-P</td>
<td>"X" in the model number to be replaced with A, B, C, D, E, and F as appropriate for the desired insert.
<table>
<tr><th>Accessory</th><th>Description</th></tr>
<tr><td>9190-INSA</td><td>Insert "A" 9190A, imperial miscellaneous holes</td></tr>
<tr><td>9190-INSB</td><td>Insert "B" 9190A, imperial comparison holes</td></tr>
<tr><td>9190-INSC</td><td>Insert "C" 9190A, 0.25 inch holes</td></tr>
<tr><td>9190-INSD</td><td>Insert "D" 9190A, metric comparison holes</td></tr>
<tr><td>9190-INSE</td><td>Insert "E" 9190A, metric miscellaneous holes with 0.25 inch hole</td></tr>
<tr><td>9190-INSF</td><td>Insert "F" 9190A, metric comparison miscellaneous holes with 0.25 inch hole</td></tr>
<tr><td>9190-INSZ</td><td>Insert “Z” 9190, blank</td></tr>
</table>
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</tr>
</table>

Accessories common to all models:

Accessory	Description
9190-INSA	Insert "A" 9190A, imperial miscellaneous holes
9190-INSB	Insert "B" 9190A, imperial comparison holes
9190-INSC	Insert "C" 9190A, 0.25 inch holes
9190-INSD	Insert "D" 9190A, metric comparison holes
9190-INSE	Insert "E" 9190A, metric miscellaneous holes with 0.25 inch hole
9190-INSF	Insert "F" 9190A, metric comparison miscellaneous holes with 0.25 inch hole
9190-INSZ	Insert “Z” 9190, blank
9190-INSY1	Insert "Y1" 9190A, custom insert with blank insulator.
9190-INSY2	Insert "Y2" 9190A, custom insert with custom insulator.

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