

5600 Series

High Precision Variable Temperature Fluid Baths



Easy to Use, High Stability Fluid Baths with Precision Temperature Control



GUILDLINE INSTRUMENTS 5600 SERIES are the latest in high precision fluid/oil baths providing uniform constant fluid temperature over a range from $-5\text{ }^{\circ}\text{C}$ to $55\text{ }^{\circ}\text{C}$. This Series of Fluid Baths is designed for both metrology and oceanographic applications and can be used with oil, water, salt water, or other liquids.

These new baths are in direct response to customer requests. For over 55 years Guildline made the best oil and fluid baths in the world but had discontinued building baths a few years ago. Many customers, including National Metrology Institutes, have emphatically stated that competing baths do not match the performance, quality, or durability of Guildline's oil and fluid baths.

Three convenient sizes are available in this series. Customers have the option of a 50 L, 75 L or 100 L Fluid Bath. The 5600 Fluid Baths provide industry leading temperature accuracy and stability.

All 5600 Baths come with a separate auxiliary temperature probe that is used for temperature monitoring. Temperature stability within $10\text{ }^{\circ}\text{C}$ of ambient is $\pm 2\text{ mK}$ while temperature stability with oil in the range of $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ is $\pm 1.5\text{ mK}$ – the best performance of any commercially available fluid or oil baths.

5600 SERIES FEATURES

- ◆ *NEW Guildline Design and Metrology Based Features!*
- ◆ *Full Automation Via Touch Screen Display (USB, IEEE)!*
- ◆ *Excellent Temperature Stability Low As:*
 $\pm 0.0015\text{ K}$ with Oil!
 $\pm 0.001\text{ K}$ with Water!
- ◆ *Fluid Temperature Range $-5\text{ }^{\circ}\text{C}$ to $55\text{ }^{\circ}\text{C}$!*
- ◆ *Designed for use with Oil, Salt Water, Water, and other Fluids!*
- ◆ *Customer Choice of Tank Sizes : 50 L, 75 L, or 100 L!*
- ◆ *Fiberglass Tank with Proprietary EMI Shielding!*
- ◆ *Convenient Access with Removable Tank Cover!*
- ◆ *Excellent Control via a PRT Sensor!*
- ◆ *Separate Probe to Report Actual Temperature anywhere in the Bath! (No Need to Purchase Separate Digital Thermometer!)*
- ◆ *Automatic and Programmable Over and Under Temperature Protection!*

The 5600 Series of Fluid Baths Provide a Perfect Environment Under a Wide Range of Operating Temperatures for Precision Equipment Such as the Oil Based Resistance Standards and CTD's.

A touch screen Control Interface Unit allows customers complete control over programming the 5600 Bath, and on reporting temperature stability. The Interface Unit can be mounted on a bracket connected to the bath, or connected to a near-by wall or fixture. Once a set temperature has been selected, the control circuitry defines the best heating (or cooling) curve to bring the bath to the set temperature with minimum overshoot, hysteresis or oscillation; in the shortest possible time.

Over Temperature safety protection is provided by a passive power disconnect temperature limit switch. Programmable over and under temperature protection is also provided. In the event of recovery from a power interruption the bath returns to the last programmed temperature.

5600 Series of Precision Fluid/Oil Baths

Uses of the 5600 Fluid Bath include: holding primary or working resistance standards; automatic calibration of temperature probes, thermistors, or resistance standards; testing oceanography sensors including CTDs; and thermal stressing of precision materials.

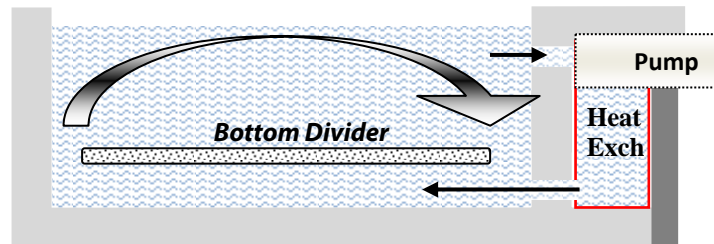


Note that this bath, including the **shielded fiberglass tank**, is designed to be corrosion resistant and to **last for decades**. Many Guildline baths have been in operation for over 40 years and this Guildline proven quality and dependability has been built into the 5600 Series.

5600 Series Construction - Designed Like No Other Temperature Fluid Bath Manufactured Today....

The 5600 Programmable Fluid Bath is a **high precision bath** for use with water, salt water, mineral oil, alcohol, ethylene glycol and fluorocarbons. The bath only uses the compressor when required and balances this to the heating/cooling level required by turning a heater on and off rapidly to provide the exact heating/cooling required adjusting to the heat losses to ambient.

The 5600 Series Fluid Bath contains an insulated fibreglass tank with a proprietary design that **provides complete EMI shielding**. Unlike the competition, the 5600 Series does NOT use Mechanical Stirrer's or multiple speed motors. The circulation pump is a magnetically driven, propylene rotor pump that mixes the liquid. It removes fluid near the top of the tank, pumps it down through the heat exchanger and back into the tank. The pump always runs when the power is on.



The discharge from the heater exchange is directed under the bottom divider of the tank. A much larger volume of liquid gets drawn down under the false bottom through a slot at one end. This flow mixes with the heat exchanger discharge. As it emerges from under the bottom divider, the liquid is so close to the mean tank temperature, that **gradients are less than 0.002 °C** throughout the bath.

The **Bath Temperature Control PRT sensor** is mounted in the outlet of the heat exchanger to compensate for heat loss. This measurement is slightly high if the set point is above ambient, and slightly low if the set point is below ambient temperature. The measurement and control circuitry is calibrated at the factory so that the displayed temperature represents mean fluid temperature to within specified accuracy.

The liquid from the pump flows down through the heat exchanger which contains two heaters and the evaporator coils of the refrigerator. Only one heater is used while controlling at a set point. The 2nd heater is only used to quickly increase the bath temperature to a higher set point, when requested.

Some mixing occurs in the outlet of the heat exchanger prior to the fluid entering the bath. The fluid flow inside the 5600 Series Baths is a laminar flow. A **Laminar flow** occurs when a fluid flows in parallel layers, with no disruption between the layers. At low velocities the fluid tends to flow without lateral mixing, and adjacent layers slide past one another like playing cards. There are no cross currents perpendicular to the direction of flow, nor eddies or swirls of fluids. In laminar flow the motion of the particles of fluid is very orderly with all particles moving in straight lines parallel to the walls.

5600 Series of Precision Fluid/Oil Baths

In addition to being designed for **best performance and ease of use**, the 5600 Fluid Bath is designed for easy



maintenance. The circulation pump, cooling unit and electronic hardware are located in a separate compartment beside the tank with a convenient access panel to provide full and unimpeded access. This compartment is EMI shielded from the bath tank, which in turn has its own EMI shield.



All Baths come with a removable gabled transparent tank cover allowing full access to the bath, and removable panels to allow easy access to the Bath interior.

5600 Series Control and Interface - Providing the Most Advanced Features Ever!

The 5600 Series Fluid Baths come standard with USB, and optionally with RS232 and IEEE 488.2. Programming is Standard Control Programmable Interchange (SCPI) based. All 5600 Series are fully compatible with the Guildline 6625T (Temperature Measurement System) and 6625A (Resistance Measurement System), and are fully controllable via Bridgeworks™ Software that comes with these Measurement Systems. The Baths can also be used with a Guildline 6664C Scanner or Model 3210 Thermometry Auto-Switch.

An external Touch Screen Control Interface Unit comes standard for manual operation and control. This is not like any other offering by any manufacturer of temperature baths. While other manufacturers may offer touch displays, they are integrated and part of the bath mainframe so if the display dies, then your bath is down until the display is repaired. For the 5600 Bath with the external display, simply connect any computer via the USB, load the 5600 Software and you are back up and running until you can get the control unit repaired – no need to return the bath!



Guildline's 5600 Series of Baths have all internal controls interfaced with the connected interface unit. The Interface Unit can be either attached at a convenient height to the bath via an optional mounting bracket or it can be attached to a wall or even mounted in another room.

Another advantage of the control Interface is that the data can easily be transferred to programs such as MS Excel, PowerPoint or even to a customer designed and written program. In fact these programs can be installed directly onto the Windows Control Tablet. Backup of Data is easy and can be controlled manually as well as automatically.

Basically all functionality of the Interface Unit such as Wireless, Bluetooth and Windows based programs are available to the users. Additionally, the functionality of the 5600 Series Bath Interface is a true Metrology Based Interface providing: fundamental control via a proportional-integral-derivative (PID) digital overlay; and storing and accessing 17025 required Metrology Based data on temperature, stability and bath operation. A true Metrologist tool!

Set Point	23.0000°C		ENABLE REMOTE		
Offset	0.0000°C				
Auxiliary Probe	23.0008°C				
Control Sensor	22.9881°C				
Auxiliary - Set Point	0.0008°C				
Auxiliary - Control	0.0227°C		RUN PATTERN		
Statistics					SET POINT
Mean	23.0007°C				
Std. Deviation	0.0000°C				
Minimum	23.0006°C				
Maximum	23.0008°C				
Spread	0.0002°C		STOP LOGGING		
Pattern					SETUP
Title	N/A				
Elapsed Time	N/A				
Remaining Time	N/A				
Current Segment	N/A				
Remaining Hold	N/A				

5600 Series of Precision Fluid/Oil Baths

SPECIFICATIONS						
Temperature Range		-5 °C to 55 °C				
Temperature Set Point Accuracy ¹		±0.01 °C over 24 hours, ±0.05 °C over 1 year				
Set Point Resolution	0.0001 °C	Display Resolution		0.0001 °C		
Temperature Stability		Oil		Water		
Set point 23 °C ±2 °C		±0.0015 K		±0.001 K		
8 °C to 21 °C ◀ Set point ▶ 25 °C to 35 °C		±0.004 K		±0.003 K		
Temperature Uniformity ²		±0.002 K relative to chamber center, 5 cm minimum from walls				
Temperature Attenuation		±0.0015 °C/°C of ambient temperature				
Heating Rate		20 °C/hour				
Cooling Rate		3 °C/hour above 20 °C		2 °C/hour below 20 °C		
Cold Power On Stabilization		1 hour to within ±2 mK of set point at ambient set point				
Temperature Monitor Accuracy		±0.01 °C				
Temperature Monitor Resolution		0.0001 °C				
Over Temperature Protection		Programmable, Automatic shutdown if temperature > 60 °C ±4 °C				
Maximum Power Dissipation of unit under test (set point above ambient)				10 W maximum		
Dimensions	5600-50L (L x W x D)		5600-75L (L x W x D)		5600-100L (L x W x D)	
Fluid Capacity	13.2 gal	50 L	19.8 gal	75 L	26.4 gal	100 L
Chamber Size	21.4 x 12.1 x 12.8 in	54.4 x 30.7 x 32.5 cm	27.0 x 13.5 x 12.8 in	68.6 x 34.3 x 32.5 cm	27.0 x 13.5 x 16.6 in	68.6 x 34.3 x 42.2 cm
Exterior Size	54.2 x 24 x 21.2 in	137.7 x 61 x 53.8 cm	54.2 x 24 x 21.2 in	137.7 x 61 x 53.8 cm	54.2 x 24 x 21.2 in	137.7 X 61 x 53.8 cm
Model Weight ³	160 lbs	72.7 kg	170 lbs	77.3 kg	180 lbs	81.8 kg
Power		100, 115, 220, 230, 240 VAC ±10 % / 50 or 60 Hz ±10 %			Volt/Amps	1400 VA
Environmental	Operating			Storage		
Temperature	50 °F to 95 °F	10 °C to 35 °C		-4 °F to 140 °F	-20 °C to 60 °C	
Humidity	10 % to 60 % RH			< 90 % RH		

1 - Set Point Accuracy and stability is defined as the deviation of the mean hourly value from the 24 hour mean for a single ambient temperature point at one point in the bath chamber (typically the center).

2 - Temperature Uniformity is relative to the center of the bath chamber and at least 5 cm from the bottom or sides of the chamber. Specification is applicable for 5 °C to 40 °C.

3 - Model weight does not include any fluids.

4 - The specifications are applicable with the chamber filled with water or oil but without any object immersed.

ORDERING INFORMATION	
5600-XXL	Precision Temperature Fluid Bath. Specify XXL as Bath Size (50L, 75L, or 100L). Includes Calibration Certificate (Report Optional)
/OM5600	Operation Manual included at no charge.
	Options Include
/CAL	Report of Calibration (Optional Charge)
SCW-18/30M	30 m Roll of Low Thermal Wire (18 AWG)
OIL-XXL	White Mineral Oil (Specify Quantity same as Bath Size in Litres)
56001	Aux PRT Holding Bracket
56002	Resistor Tray with Adjustable Height (-1 : 50 L or -2 : 75 L or 100 L)
56003	Tablet Stand (Height Adjustable)
56004	Storage Cart
56005	Drip Tray
56006	Cable Guide (-1 : 50 L or -2 : 75 L or 100 L)
56007	Drain Pump

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