# 5600 SERIES

## HIGH PRECISION VARIABLE TEMPERATURE FLUID BATHS

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

**300L Model Now Available!**



**5600 Fluid Bath with 56004 Storage Cart**

## FEATURES

- NEW Guildline Design and Metrology Based Features!
- Full Automation Via Windows 10 Computer (USB, IEEE)!
- Excellent Temperature Stability Low As:
  ±0.0015 K with Oil!
  ±0.001 K with Water!
- Fluid Temperature Range -5 °C to 55 °C!
- Designed for use with Oil, Salt Water, Water, and other Fluids!
- Customer Choice of 4 Tank Sizes: 50 L, 75 L, 100 L and Now - NEW 300 L Model!
- Fiberglass Tank with Proprietary EMI Shielding!
- Convenient Access with Removable Tank Cover!
- Excellent Control via a PRT Sensor!
- 2nd Probe Included to Report Actual Temperature Anywhere in the Bath!
- Automatic and Programmable Over and Under Temperature Protection!

**Guildline Instruments 5600 SERIES** is the latest in high precision fluid/oil baths providing uniform fluid temperature over a range from -5 °C to 55 °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.

**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**

These new baths are in response to customer requests. For over 60 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.

Four convenient sizes are available in this Series. Customers have the option of a 50 L, 75 L, 100 L or 300 L Fluid Bath. The 5600 Fluid Baths provide industry leading temperature accuracy and stability.

All 5600 Baths come with a second integrated temperature probe that can be used for temperature monitoring anywhere in the bath. Competing baths require a separate 3rd-party temperature probe to report the actual bath temperature! Stability within 2 °C of ambient (i.e. 23 °C ± 2 °C) is ± 1 mK while temperature stability with oil is ± 1.5 mK – the best performance of any commercially available fluid or oil baths.

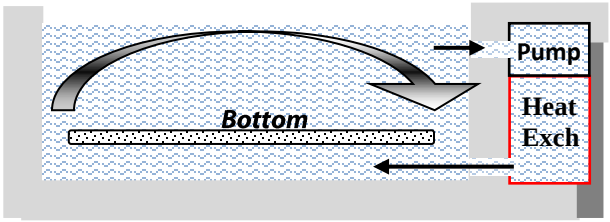
A touch screen Control Interface Unit (i.e. Windows 10 Computer) allows customers complete control over programming the 5600 Bath, and on reporting temperature stability. There is no requirement to write special software to integrate a 3rd-party temperature probe necessary to report the actual temperature of the fluid in the bath. The Interface Unit can be mounted on a bracket connected to the bath, or attached to a nearby 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 via software. In the event of recovery from a power interruption the bath returns to the last programmed temperature. 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 EMI shielded fibreglass tank, is designed to be corrosion resistant and to last for decades. Many Guildline baths have been in operation for over 50 years and this same Guildline proven quality and dependability has been built into the 5600 Series.



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. The Compressor has 500 W of power and uses C134A cooling fluid.

The 5600 Series Fluid Bath uses 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 so the total bath interior is available for use. 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 close to the mean tank temperature so that gradients are less than 0.002 °C throughout the bath. The use of fibreglass also provides for rounded corners so that there are no eddy`s and fluid flow is consistent throughout the bath; and the use of a special 'slippery' gelcoat paint on the fibreglass facilitates the laminar flow.

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. The control heater has 500 W of power and the 2nd booster heater has 450 W of power.

Some mixing occurs in the outlet of the heat exchanger prior to the fluid entering the bath. The fluid flow inside the 5600 Bath 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.

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 panel to provide full and unimpeded access. This compartment is EMI shielded from the bath tank, which in turn has its own EMI shield.

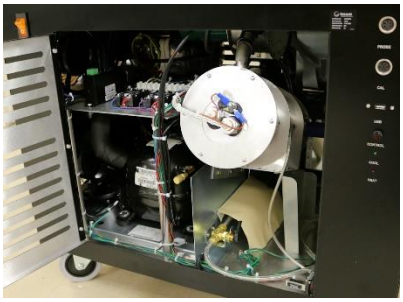
For the larger 300L size there are two separate units, each on wheels. The circulation pump, cooling unit, and electronic hardware are the same, but are placed in a physically separate Control/Mechanical cabinet. This separate cabinet is connected to the separate large 300L bath by insulated flexible hoses that can be of customer chosen length. This unique design allows the **5600-300 Litre bath to fit through a standard door and into a standard elevator** and provides flexibility in how the bath is placed in a laboratory. For example the bath tank and the mechanical unit can be placed side-by-side, at right angles, or even with the mechanical unit behind the bath tank.




**5600-300L Control/Mechanical Unit and Tank Unit**

All Baths come with a removable EMI shielded gabled transparent tank cover allowing full access to the bath, and removable panels to allow easy access to the Bath interior. This entry access is shown to the left (closed) and the right (door open).



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

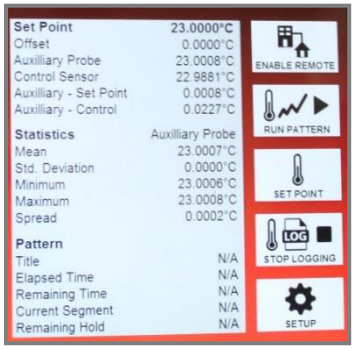
The 5600 Series Fluid Baths come standard with USB, and optionally with RS232 and IEEE 488.2. Programming is Standard Control Programmable Interchange (SCPI) based. The 5600 Series is fully compatible with the Guildline 6625T or 6645T (Temperature Measurement Systems) and 6625A (Resistance Measurement System); and is fully controllable via the 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 (i.e. Windows 10 Computer) 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 connected to the 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 Interface / Control Computer. Backup of Data is easy and can be controlled manually as well as automatically.

All functionality of the Interface Unit such as Wireless, Bluetooth and Windows based programs are available to 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!

| SPECIFICATIONS (ALL MODELS) | | | |
|---|---|---|---|
| Temperature Range | | 3 °C to 55 °C for water<br>1 °C to 55 °C for salt water<br>-5 °C to 55 °C for alcohol and ethylene glycol | |
| 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 (50L to 100L Models) | | 20 °C/hour | |
| Heating Rate 300L Model | | 10 °C/hour | |
| Cooling Rate (50L to 100L Models) | | 3 °C/hour above 20 °C | 2 °C/hour < 20 °C and > 5°C |
| Cooling Rate 300L Model | | 1.5 °C/hour above 20 °C | 1 °C/hour < 20 °C and > 5°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 |
| Temperature Operating | | 50 °F to 95 °F | 10 °C to 35 °C |
| Temperature Storage | | -4 °F to 140 °F | -20 °C to 60 °C |
| Storage Humidity | < 90 % RH | Operating Humidity | -10 % to 60 % RH 20 °C to 60 °C |

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 relative to the center of the bath chamber and 5 cm from the bottom or sides of the chamber. Specification applies to 5 °C to 40 °C.

## Specifications (Continued)

| | **5600-50L** (L x W x D) | | **5600-75L** (L x W x D) | | **5600-100L** (L x W x D) | |
|---|---|---|---|---|---|---|
| Tank Capacity [5] | 13.2 gal | 50 L | 19.8 gal | 75 L | 26.4 gal | 100 L |
| Tank 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 |
| Weight[3] | 160 lbs | 72.7 kg | 170 lbs | 77.3 kg | 180 lbs | 81.8 kg |
| Power (VAC) | 100, 115, 220, 230, 240 - ±10 % / 50 or 60 Hz ± 10 % | | | | | |

| | **5600-300L** Mechanical Unit [4] (L x W x D) | | **5600-300L** Tank Unit [4] (L x W x D) | |
|---|---|---|---|---|
| Tank Capacity [5] | - | - | 79.3 gal | 300 L |
| Tank Size | - | - | 39.4 x 25 x 20.5 in | 100.1 x 63.5 x 52.1 cm |
| Exterior Size | 30.3 x 21.3 x 25.7 inches | 76.8 x 54.0 x 65.2 cm | 55.2 x 30.3 x 28.6 in | 140.3 x 76.8 x 72.7 cm |
| Weight[3] | 250 lbs | 114 kg | 325 lbs | 148 kg |
| Power (VAC) | 100, 115, 220, 230, 240 - ±10 % / 50 or 60 Hz ± 10 % | | - | |

3 - Model weight does not include any fluids.
4 - 300L Bath consists of a Tank Unit and a Control/Mechanical Unit for the pump, compressor and heat exchanger. Dimensions are for each unit.
5 - Tank Capacity is with the chamber filled, but no standards immersed. Actual capacity may be slightly more due to pump and tubes within the Bath.

| ORDERING INFORMATION | |
|---|---|
| 5600-XXL | Precision Temperature Fluid Bath. Specify XXL as Bath Size (50L, 75L,100L or 300L). Includes Calibration Certificate (Report Optional) |
| /OM5600 | Operation Manual included at no charge |
| | Separate PRT for Bath included at no charge |
| | **Options Include:** |
| /CAL | Report of Calibration (Optional Charge) |
| SCW-18/30M | 30 m Roll of Low Thermal Wire (18 AWG) |
| 56001 | Thermistor Probe Cable |
| 56001-1 | Temperature Probe Holder, 50 L |
| 56001-2 | Temperature Probe Holder, 75/100 L |
| 56001-3 | Temperature Probe Holder, 300 L |
| 56002-1 | Resistor Tray, Adjustable Height, 50 L |
| 56002-2 | Resistor Tray, Adjustable Height, 75/100 L |
| 56002-3 | Resistor Tray, Adjustable Height, 300 L |
| 56004 | Storage Cart (Only for 50 L, 75 L and 100 L Models) |
| 56005 | Drip Tray |
| 56006-1 | Cable Guide, 50 L |
| 56006-2 | Cable Guide, 75/100 L |
| 56006-3 | Cable Guide, 300 L |
| 56007 | Drain Pump |
| 56008-1 | Containment Pallet, 250 L |
| 56008-2 | Containment Pallet, 300 L |
| 56009 | Patch Panel |

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