CALIBRATION BATH FLUIDS

APPLICATIONS

- Thermostatic fluids for portable calibrators and thermostatic baths

MAIN CHARACTERISTICS

- Operating range: -50 °C ... +200 °C
- High stability
- Good thermal conductivity
- Nearly odourless
- Long service live
- Packaged in bottle or tan
- Different types for a wide range applications
- Toxicity low
- Viscosity and corrosivity low

Our thermostatic fluids are suitable for use in liquid thermostatic calibrators and thermostatic baths for applications from -50°C to +200°C.

The choice of thermostatic fluid is the most important aspect for obtaining the best results with regard to operation and temperature control of calibrators and baths.

These fluids have perfect thermodynamic characteristics to guarantee the best performance in the various fields of application, ensuring safe and reliable operation as well as optimum heat transfer efficiency.

Silicone-based fluids are chemically inert substances that do not affect metals, are resistant to weathering and, when used correctly, the very low formation of cracking and oxidation ensures a long service life.

Most of our thermostatic fluids are available in different formats:
500 cc bottle, 9 kg tan and 25 kg tan.

Order Code	Description
SILICONE47V5	SILICON OIL type 47V5 in kg 9 tan
SILICONE47V10	SILICON OIL type 47V10 in kg 9 tan
SILICONE47V20	SILICON OIL type 47V20 in kg 9 tan
SILICONE47V50	SILICON OIL type 47V50 in kg 9 tan
SILICONE47V100	SILICON OIL type 47V100 in kg 9 tan
SILICONES1050	SILICON OIL type S1050 in Kg. 25 tan
TANICAGLICOLE	GLICOLE ETHYLENICO in Kg 9 tan

Order Code	Description
BOTTLE47V10	SILICON OIL 47V10 in 500 cc bottle
BOTTLE47V20	SILICON OIL 47V20 in 500 cc bottle
BOTTLE47V50	SILICON OIL 47V50 in 500 cc bottle
BOTTLE47V100	SILICON OIL 47V100 in 500 cc bottle
BOTTLES1050	SILICON OIL S1050 in 500 cc bottle
BOTTLE200C5	SILICON OIL 200C5 in 500 cc bottle

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TESTING EXPERTISE

CALIBRATION BATH FLUIDS

CALIBRATION BATH FLUIDS GUIDE

SPECIFICATIONS TABLE		USABLE RANGE (1)	TEMPERATURE VALUE ABOVE WHICH AN EXATRACTOR HOOD SHOULD BE USED (2)	FUME BURNING(3)	EQUIVALENT TEMPERATURE FOR 10cst VISCOSITY (4)	FREEZING TEMPERATURE (5)
ORDER CODE	LIQUID TYPES					
TANICAGLICOLE*	Monoethylene Glycol	-40/90	70°C	>110°C	20°C	-43°C
SILICONE47V5	Calsil IP5	-40/130	110°C	136°C	5°C	-65°C
SILICONE47V10	Calsil IP10	-30/150	120°C	160°C	20°C	-65°C
SILICONE47V20	Calsil IP20	-20/200**	130°C	230°C	60°C	-60°C
SILICONE47V50	Calsil IP50	30/200**	140°C	280°C	160°C	-55°C
SILICONE47V100	Calsil IP100	50/200**	170°C	>300°C	200°C	-55°C
SILICONES1050	Caltherm S1050	50/200**	190°C	>300°C	/	-55°C

* Mixture of Glycol 56% + water
** In order to avoid gelling, it is recommended not to exceed a temperature of 200°C for a long time; even for fluids with wider operating ranges

1) USABLE RANGE

The «usable range» of a bath fluid is the range of temperature in which it can be used under optimum conditions.
Range can be limited by viscosity, flash points, freeze points, boiling points, evaporation rates, propensity to gel (or polymerize), etc..
No fluid exists to cover extremely wide temperature ranges; so, ideally, you should have a separate bath for each temperature range. **The recommended range is where the viscosity, while not optimal, remains at values that allow proper use.**

(2) USE OF EXTRACTOR HOOD

The use of a fume hood for baths prevents users from breathing in fumes calibration oils. Suction devices placed near the bath access opening are best. The vapour can settle on the mucous membranes of the eyes or on the skin, causing some discomfort. Silicone oils can create benzene and formaldehyde when they decompose at high temperatures. **The table shows the temperature value above which a fume extractor hood should be used.**

(3) FLASH POINT

The table shows the temperature value at which the presence of an open flame can ignite vapours combustion.

(4) VISCOSITY

Viscosity is a measure of the resistance to flow of a fluid and is characterised by increasing with decreasing fluid temperature and the contrary. Kinetic viscosity is the ratio of absolute viscosity to density; it is measured in *stokes* and in *centistokes* (1 *stokes* divided by 100). The higher the number of centistokes, the more viscous or dense a fluid is. Fluids that are excessively viscous create stresses on the agitation and pumping mechanisms, and do not transfer heat adequately. **The table shows the temperature value below which the performance of the thermostatic bath would no longer be optimal. The equivalent value of water at 20°C is a 1.1 cst.**

(5) FREEZING POINT

Silicone oils also change their state by solidifying below a certain temperature. **The table shows the value below with the liquid changes state and solidifies.**

OTHER PHYSICAL AND CHEMICAL PROPERTIES

Specific Heat

The specific heat is the amount of heat required to increase or decrease the temperature by 1°C for each kg. The specific heat called CP is expressed in Kcal/Kg °C - The energy required to heat or cool the calibration fluids depends on the amount in kg contained in the calibrator or thermostat bath and its specific heat. A high specific heat value requires more energy in the temperature change but provides greater temperature stability.
The average CP of silicone fluids is 35 Kcal/Kg °C.The CP of water at 20°C is equal to 1.

Thermal conductivity

La Thermal conductivity is the fluid's ability to transfer heat from one molecule to another. The better the heat transfer, the quicker the fluid will heat or cool. Better thermal conduction improves bath uniformity.

Espansion

All fluids have a coefficient of thermal expansion, the coefficient tell how much a fluid's volume will change (expand or contract) with changes in temperature. Fluid expansion has important ramifications for safety, cleanliness and care of equipment.
If baths are filled too high with a fluid at a low temperature and then heated without regard to volume increase, they can obviously overflow.
If, in a thermostatic bath, the fluid is left at an excessively low level, below the bath heaters, the temperature rise of the non-immersed part could ignite the liquid.

Gelling (polymerization)

The gelling temperature is the temperature at which silicone fluids oxidise, gelling and turning into a viscous mush. The main cause of this phenomenon is oxidation. Although silicone oils can be used safely up to their flash point, susceptibility to polymerisation increases with use above their oxidation points. To ritard polymerisation, it is useful to limit the bath time above the oxidation point of the silicone oil used to keep away any contaminants (salts, other oils and oxidants) and to change the oil when it becomes dark, viscous or temperature unstable. **It is important to limit the time of use at high temperatures to preserve the degradation of the oil and extend its service life.**

CERTIFICATION:
All instruments are supplied with final testing, stability and accuracy report traceable to Accredia standards.

TESTING
EXèPERTISE

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