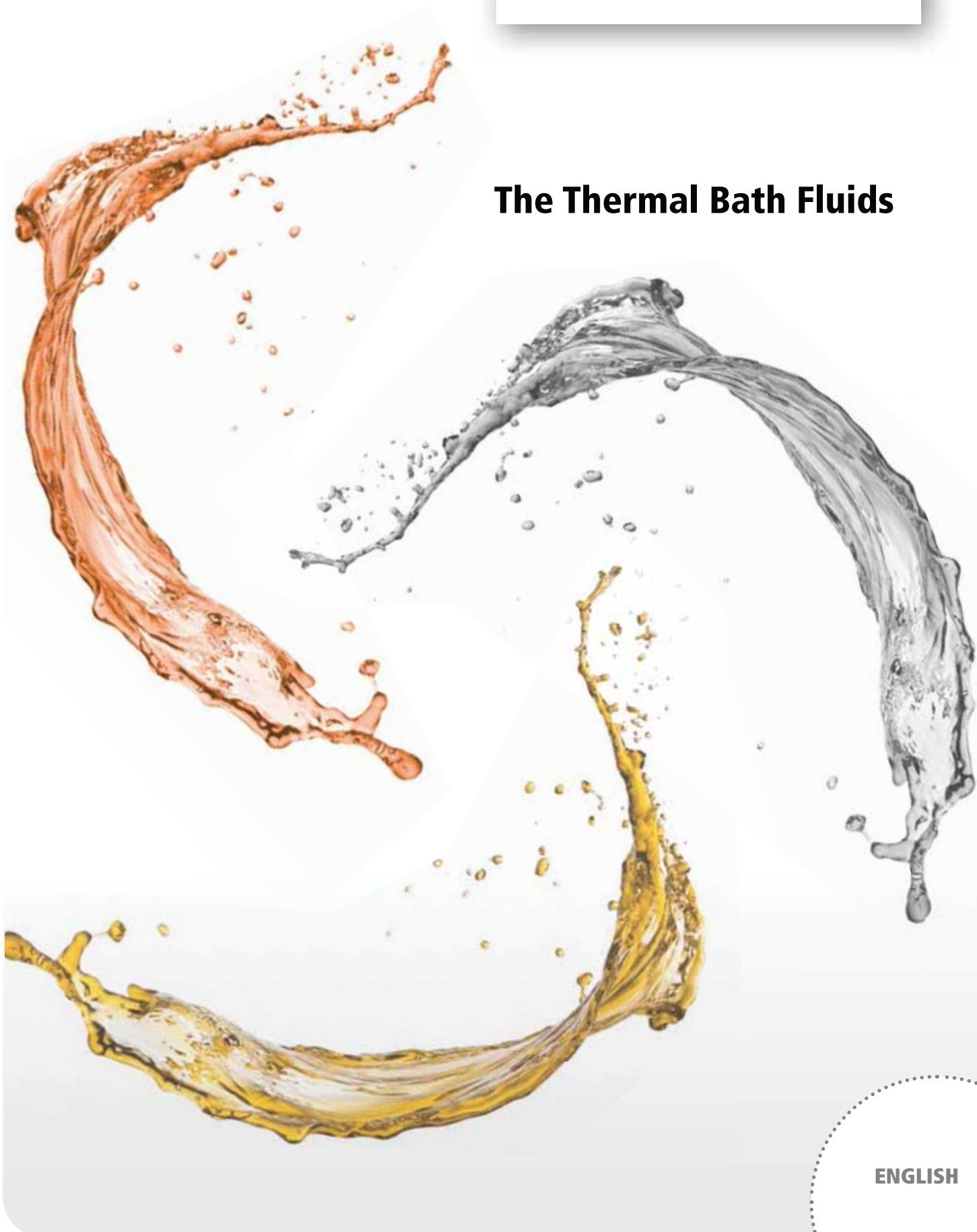


## The Thermal Bath Fluids



## General information

### on JULABO Bath Fluids

JULABO Thermal Bath Fluids are carefully chosen and long-term tested media. They are highly suitable for temperature applications in JULABO units and guarantee safe and reliable operation.

#### JULABO Thermal Bath Fluids based on silicone...

...are chemically inert substances which do not affect metals like iron, copper, zinc, aluminum, chrome or nickel. Compared to other fluids, JULABO Thermal fluids have an extraordinarily high dielectric strength. When properly stored, the fluid will keep for at least 12 months as they are not susceptible to climatic influences. When used properly, minimal cracking and oxidation degradation will occur ensuring a long fluid life. When operating fluids at temperatures close to the recommended limits, visually inspect and/or exchange the fluid every 2-3 months. Some JULABO bath fluids based on silicone contain a stabilizer to delay oxidation and thus increase the lifetime of the oil.

**Do not use with silicone hoses!** Silicone based bath fluids can swell and dissolve silicone hoses. Therefore use JULABO metal tubing or JULABO Viton tubing or JULABO PTFE tubing for the temperature control of external systems.

#### JULABO Thermal Bath Fluids based on water-glycol...

...(Monoethylene glycol with anti-corrosion additives) have excellent thermal characteristics and a low viscosity. In addition they provide anti-freeze protection, i.e. they can be applied at temperatures below the freezing point of water.

**Observe the mixing ratio!** When using water-glycol based bath fluids, the mixing ratio of water to glycol must be checked on a regular basis (50:50). In case of an increased glycol content, the liquid may become flammable. Conversely, an increased water content may cause the liquid to freeze at low temperatures.



-100 °C















0 °C

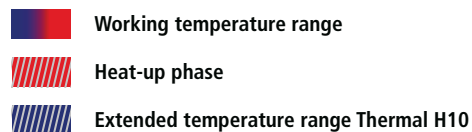
+100 °C

# Content

## Which Bath Fluid do I need?

The choice of the suitable bath fluid is crucial for optimal temperature control results. The most important criteria for your reliable choice is the working temperature range in which you operate your application. All other properties of the JULABO Thermal Bath Fluids like viscosity, oxidation behavior and heat conductivity are ideally matched for their use with JULABO temperature control instruments. If you need assistance when choosing the bath fluid, a JULABO expert will be glad to support you.

| Bath fluid                  | Page | Working temperature range   |      |         |         |         |         |
|-----------------------------|------|---|------|---------|---------|---------|---------|
| Open Systems                |      | -100 °C   | 0 °C | +100 °C | +200 °C | +300 °C | +400 °C |
| Thermal G                   | 4    | -30  +80     |      |         |         |         |         |
| Thermal M                   | 6    | +70  +170   |      |         |         |         |         |
| Thermal HS                  | 8    | +50  +250   |      |         |         |         |         |
| Thermal HY                  | 10   | -80  +55    |      |         |         |         |         |
| Thermal H5                  | 12   | -50  +105  |      |         |         |         |         |
| Thermal H10                 | 14   | -20  +180 |      |         |         |         |         |
| Thermal H20S                | 16   | 0  +220   |      |         |         |         |         |
| Closed systems              |      |   |      |         |         |         |         |
| PRESTO                      |      |   |      |         |         |         |         |
| Thermal HL30                | 18   | -30  +90   |      |         |         |         |         |
| Thermal HL60                | 20   | -60  +250 |      |         |         |         |         |
| Thermal HL80                | 22   | -85  +170 |      |         |         |         |         |
| Forte HT                    |      |   |      |         |         |         |         |
| Thermal H250S               | 24   | +20  +250 |      |         |         |         |         |
| Thermal H335                | 26   | +40  +335 |      |         |         |         |         |
| Thermal H350                | 28   | +50  +350 |      |         |         |         |         |
| Water bath protective media |      |   |      |         |         |         |         |
| Aqua Stabil                 | 30   | +20  +80   |      |         |         |         |         |



+200 °C

+300 °C

+400 °C

## Bath fluid Thermal G

JULABO Thermal G is a bath fluid based on water-glycol and features excellent thermal properties. In addition, JULABO Thermal G supplies anti-freeze protection and thus it is most suitable for applications below the freezing point of water.

**Check the mixing ratio!** When using Thermal G for long time periods, the mixing ratio of water to glycol must be checked regularly (50:50). In case of increased glycol content, the Thermal G may become flammable. Conversely, increased water content may cause the Thermal G to freeze at low temperatures.

Please observe the information in our safety data sheet. You can download the safety data sheet at [www.julabo.com](http://www.julabo.com) or request it from JULABO.

### Advantages:

- High stability
- Low viscosity
- Good heat conductivity
- Minimum odor
- Low corrosion tendency
- Low toxicity

| Property  | Value          |
|---|----------------|
| Working temperature °C                            | -30 ... +80    |
| Flash point °C                                    | not applicable |
| Fire point °C                                     | not applicable |
| Viscosity (kinematic at 20 °C) mm <sup>2</sup> /s | 4.07           |
| Density (at 20 °C) g/cm <sup>3</sup>              | 1.08           |
| Pour point °C                                     | -70            |
| Boiling point °C                                  | +108           |
| Ignition temperature °C                           | +430           |
| Color   | light yellow   |
| Thermal expansion coefficient K <sup>-1</sup>     | 0.0007         |
| Heat conductivity [W/(m x K)]                     | 0.153          |
| Specific volume resistivity [Ohm x cm]            | 200            |

| Order number |           |
|--------------|-----------|
| 8 940 125    | 5 liters  |
| 8 940 124    | 10 liters |

Suitable for the following units:

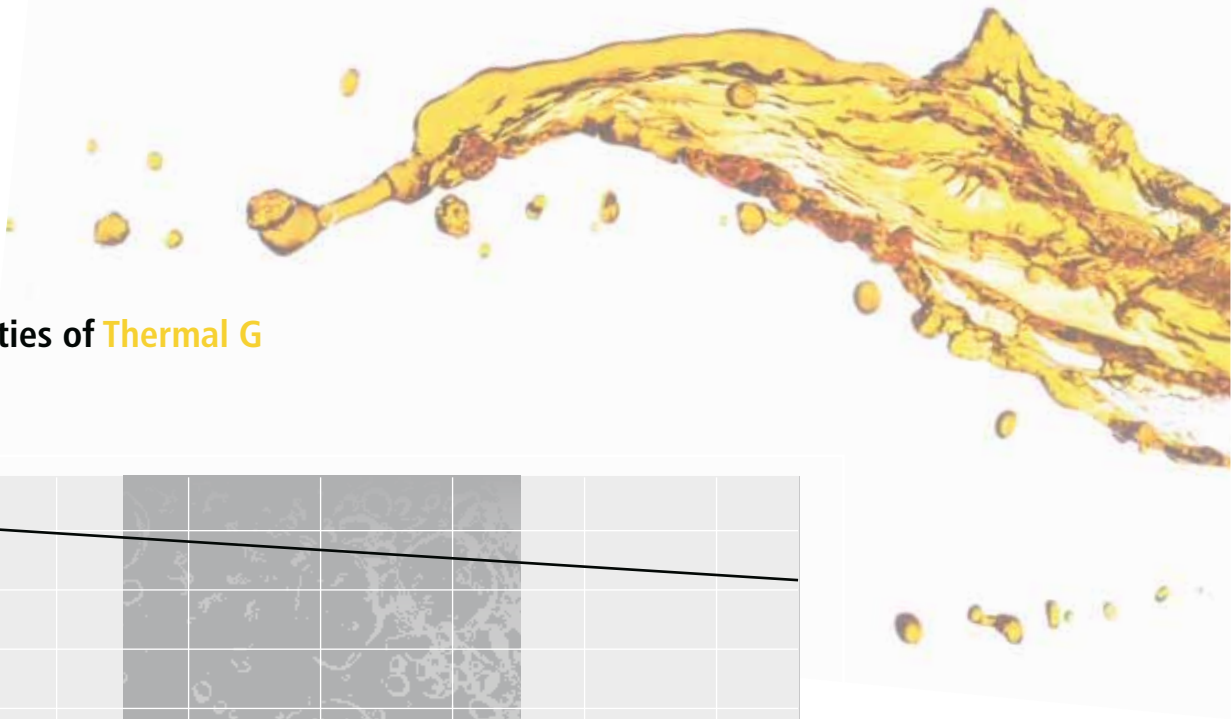
- JULABO Refrigerated Circulators
- JULABO Heating Circulators
- JULABO Chillers/Recirculating Coolers

Note the tip on  
page 32  
for the expansion  
of bath fluids in  
your application

-100 °C

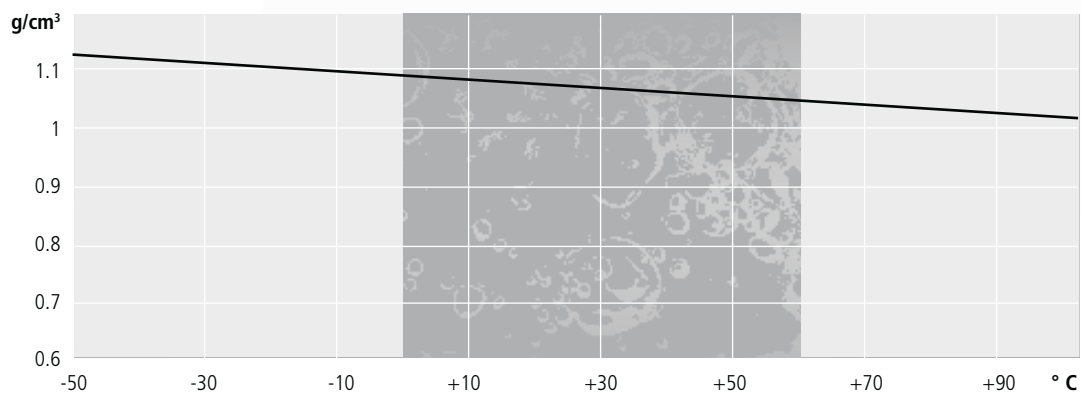
0 °C

+100 °C

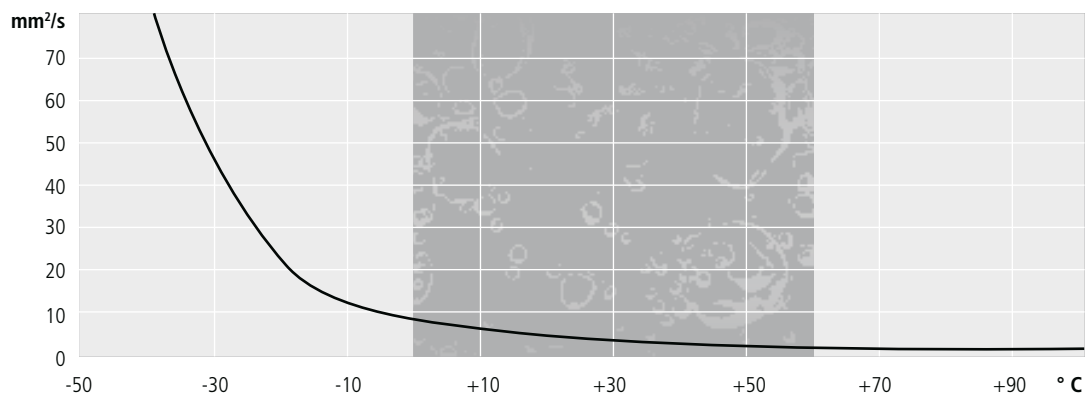


## Physical properties of Thermal G

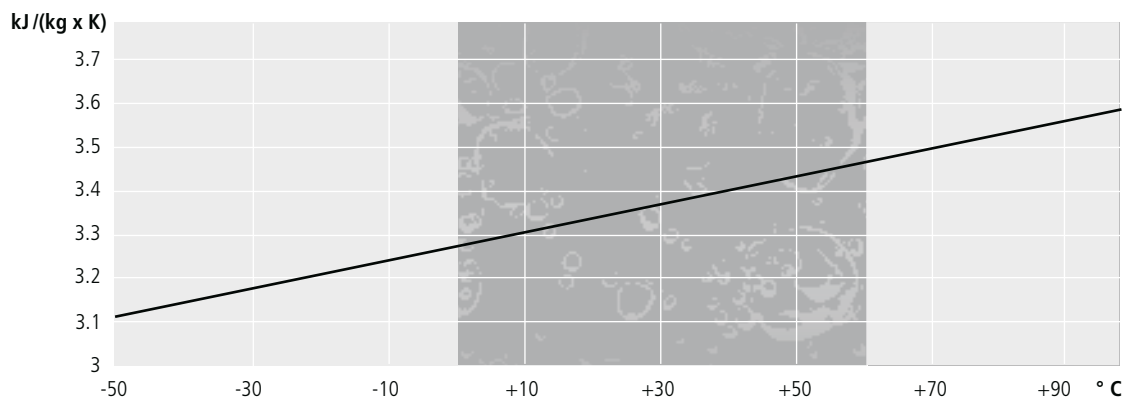
### Density



### Viscosity



### Specific heat capacity



measured range  
calculated range

+200 °C

+300 °C

+400 °C

## Bath fluid Thermal M

JULABO Thermal M is a bath fluid based on alcohol ethoxylate.

**Please note:** Usage of the fluid below the lowest mentioned working temperature may result in temperature fluctuation or high temperature alarm due to hot fluid areas around the heater.

Recommendation: Reduce the heater capacity during heating up until the lowest mentioned working temperature is reached.

Please observe the information in our safety data sheet. You can download the safety data sheet at [www.julabo.com](http://www.julabo.com) or request it from JULABO.

### Advantages:

- High stability
- Low viscosity
- Good heat conductivity
- Minimum odor
- Low corrosion tendency
- Low toxicity
- Long fluid life

| Properties  | Value        |
|---|--------------|
| Working temperature °C                            | +70 ... +170 |
| Flash point °C                                    | +284         |
| Fire point °C                                     | +306         |
| Viscosity (kinematic at 20 °C) mm <sup>2</sup> /s | 293          |
| Density (at 20 °C) g/cm <sup>3</sup>              | 1.15         |
| Pour point °C                                     | -39          |
| Boiling point °C                                  | >+170        |
| Ignition temperature °C                           | >+255        |
| Color   | clear        |
| Thermal expansion coefficient K <sup>-1</sup>     | 0.00077      |
| Heat conductivity [W/(m x K)]                     | 0.2          |
| Specific volume resistivity [Ohm x cm]            | n/a          |

| Order number |           |
|--------------|-----------|
| 8 940 101    | 5 liters  |
| 8 940 100    | 10 liters |

Suitable for the following units:

- JULABO TopTech / HighTech Series

Note the tip on  
page 32  
for the expansion  
of bath fluids in  
your application

-100 °C

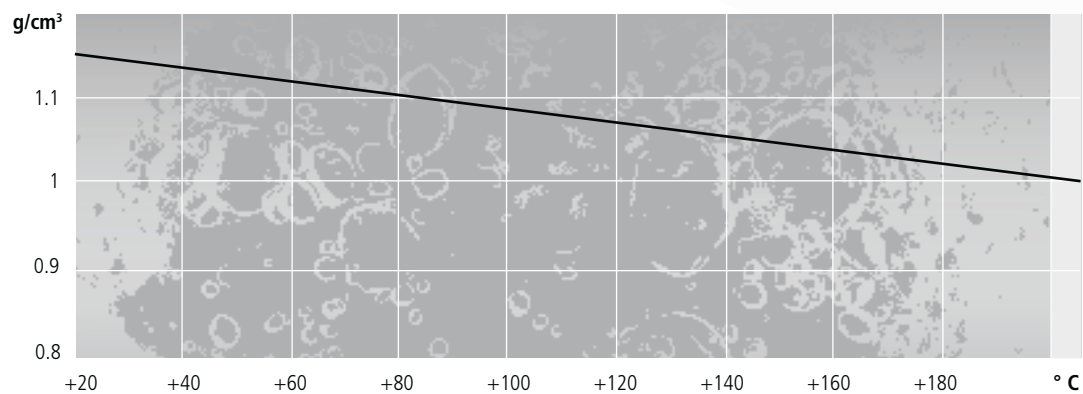
0 °C

+100 °C

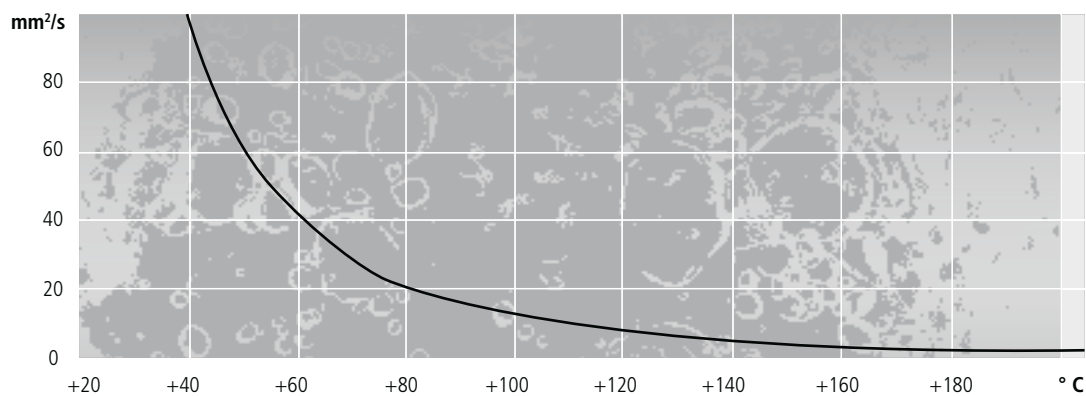


## Physical properties of Thermal M

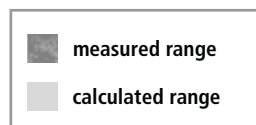
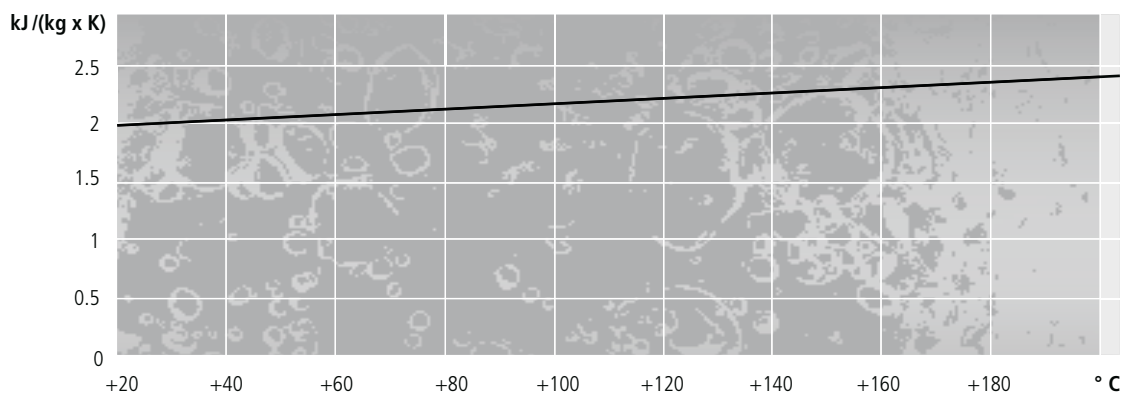
### Density



### Viscosity



### Specific heat capacity



+200 °C

+300 °C

+400 °C

## Bath fluid Thermal HS

JULABO Thermal HS is a bath fluid based on silicone.

**Please note:** Usage of the fluid below the lowest mentioned working temperature may result in temperature fluctuation or high temperature alarm due to hot fluid areas around the heater.

Recommendation: Reduce the heater capacity during heating up until the lowest mentioned working temperature is reached.

**Do not use with silicone hoses!** Silicone-based bath fluids can swell and dissolve silicone hoses. Therefore use JULABO metal tubing or JULABO Viton tubing or JULABO PTFE tubing for the temperature control of external systems.

Please observe the information in our safety data sheet. You can download the safety data sheet at [www.julabo.com](http://www.julabo.com) or request it from JULABO.

### Advantages:

- High stability
- Good heat conductivity
- Minimal odor
- Low corrosion tendency
- Low toxicity
- Long fluid life

| Property  | Value                |
|---|----------------------|
| Working temperature °C                            | +50 ... +250         |
| Flash point °C                                    | +270                 |
| Fire point °C                                     | +360                 |
| Viscosity (kinematic at 20 °C) mm <sup>2</sup> /s | 55                   |
| Density (at 20 °C) g/cm <sup>3</sup>              | 0.96                 |
| Pour point °C                                     | <-60                 |
| Boiling point °C                                  | >300                 |
| Ignition temperature °C                           | >+400                |
| Color   | light brown          |
| Thermal expansion coefficient K <sup>-1</sup>     | 0.00089              |
| Heat conductivity [W/(m x K)]                     | 0.153                |
| Specific volume resistivity [Ohm x cm]            | 6 x 10 <sup>14</sup> |

| Order number |           |
|--------------|-----------|
| 8 940 103    | 5 liters  |
| 8 940 102    | 10 liters |

Suitable for the following units:

- JULABO Heating Circulators
- JULABO Refrigerated Circulators

Note the tip on  
page 32  
for the expansion  
of bath fluids in  
your application

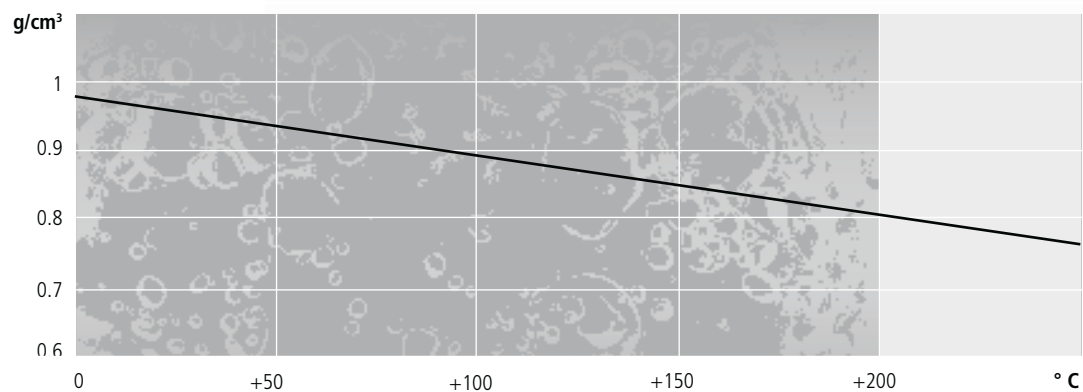
-100 °C

0 °C

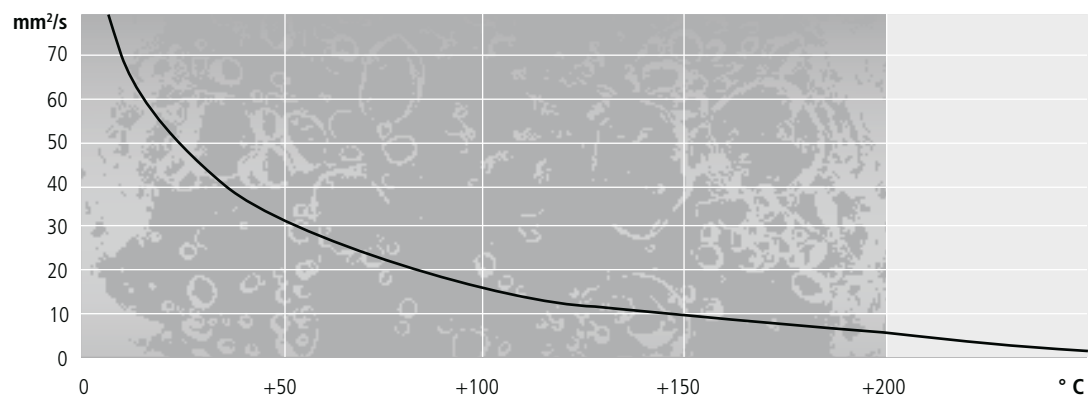
+100 °C

## Physical properties of Thermal HS

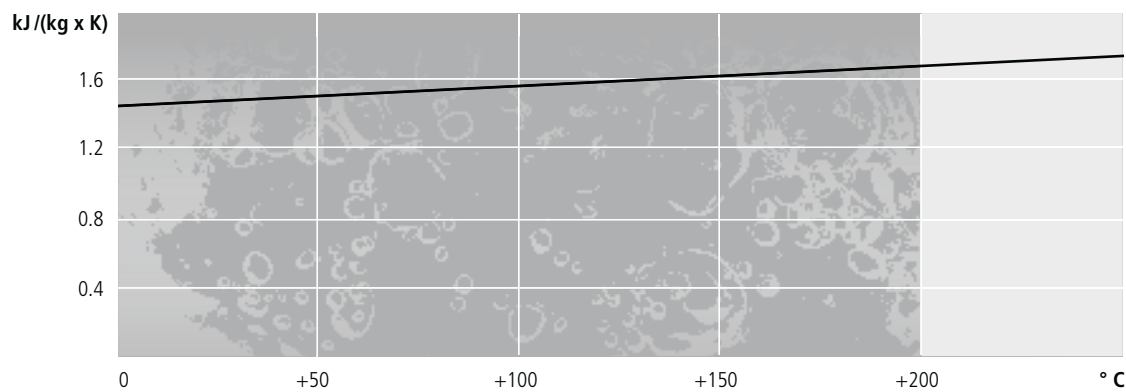
### Density



### Viscosity



### Specific heat capacity



■ measured range  
■ calculated range

+200  $^{\circ}\text{C}$

+300  $^{\circ}\text{C}$

+400  $^{\circ}\text{C}$

## Bath fluid Thermal HY

JULABO Thermal HY is a bath fluid based on silicone.

**Do not use with silicone hoses!** Silicone-based bath fluids can swell and dissolve silicone hoses. Therefore use JULABO metal tubing or JULABO Viton tubing or JULABO PTFE tubing for the temperature control of external systems.

Please observe the information in our safety data sheet. You can download the safety data sheet at [www.julabo.com](http://www.julabo.com) or request it from JULABO.

### Advantages:

- High stability
- Good heat conductivity
- Minimal odor
- Low corrosion tendency
- Low toxicity
- Long fluid life

| Property  | Value                |
|---|----------------------|
| Working temperature °C                            | -80 ... +55          |
| Flash point °C                                    | +62                  |
| Fire point °C                                     | +80                  |
| Viscosity (kinematic at 20 °C) mm <sup>2</sup> /s | <4                   |
| Density (at 20 °C) g/cm <sup>3</sup>              | 0.9                  |
| Pour point °C                                     | -100                 |
| Boiling point °C                                  | +228.5               |
| Ignition temperature °C                           | +335                 |
| Color   | clear                |
| Thermal expansion coefficient K <sup>-1</sup>     | 0.00098              |
| Heat conductivity [W/(m x K)]                     | 0.105                |
| Specific volume resistivity [Ohm x cm]            | 4 x 10 <sup>14</sup> |

| Order number |           |
|--------------|-----------|
| 8 940 105    | 5 liters  |
| 8 940 104    | 10 liters |

Suitable for following units:  
- JULABO Refrigerated Circulators

Note the tip on  
page 32  
for the expansion  
of bath fluids in  
your application

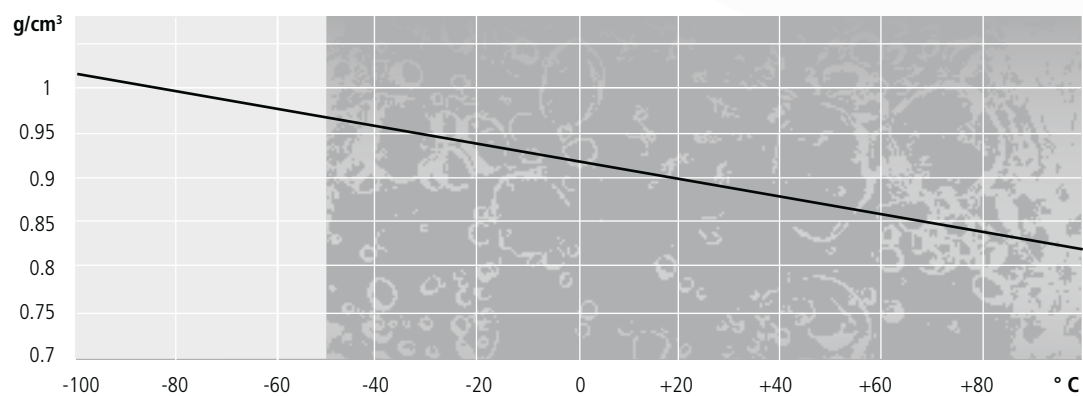
-100 °C

0 °C

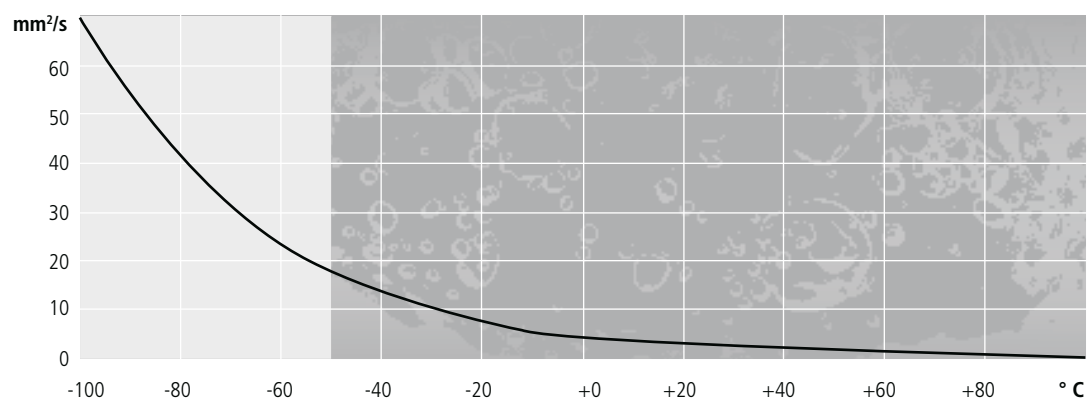
+100 °C

## Physical properties of Thermal HY

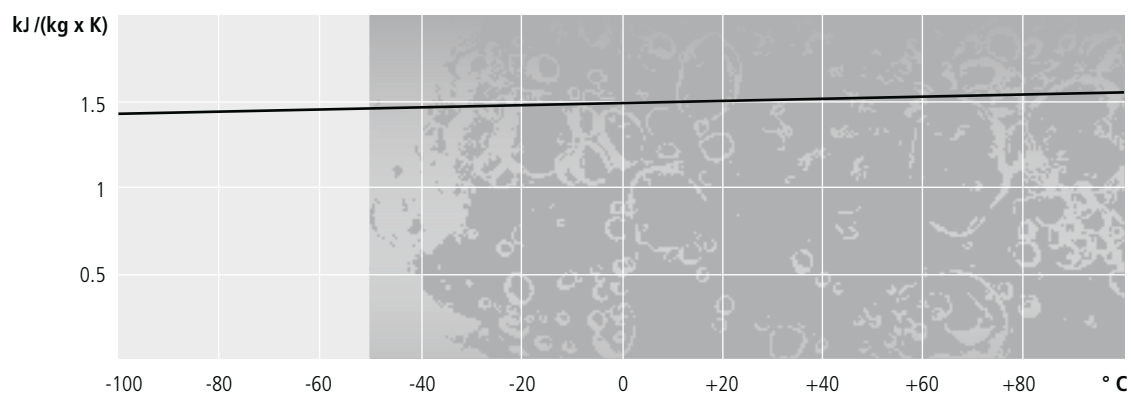
### Density



### Viscosity



### Specific heat capacity



■ measured range  
■ calculated range

+200  $^{\circ}\text{C}$

+300  $^{\circ}\text{C}$

+400  $^{\circ}\text{C}$

## Bath fluid Thermal H5

JULABO Thermal H5 is a bath fluid based on silicone.

**Do not use with silicone hoses!** Silicone-based bath fluids can swell and dissolve silicone hoses. Therefore use JULABO metal tubing or JULABO Viton tubing or JULABO PTFE tubing for the temperature control of external systems.

Please observe the information in our safety data sheet. You can download the safety data sheet at [www.julabo.com](http://www.julabo.com) or request it from JULABO.

### Advantages:

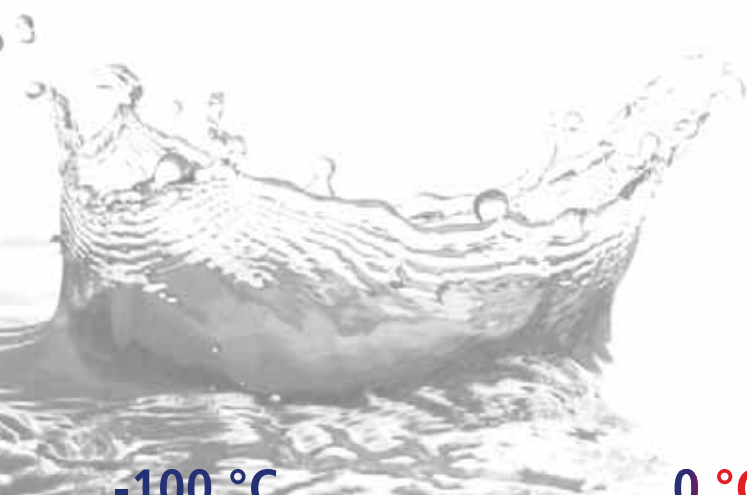
- High stability
- Low viscosity
- Good heat conductivity
- Minimum odor
- Low corrosion tendency
- Low toxicity
- Long fluid life

| Property  | Value                |
|---|----------------------|
| Working temperature °C                            | -50 ... +105         |
| Flash point °C                                    | +124                 |
| Fire point °C                                     | +142                 |
| Viscosity (kinematic at 20 °C) mm <sup>2</sup> /s | 5.66                 |
| Density (at 20 °C) g/cm <sup>3</sup>              | 0.92                 |
| Pour point °C                                     | -100                 |
| Boiling point °C                                  | +288                 |
| Ignition temperature °C                           | +350                 |
| Color   | clear                |
| Thermal expansion coefficient K <sup>-1</sup>     | 0.00094              |
| Heat conductivity [W/(m x K)]                     | 0.116                |
| Specific volume resistivity [Ohm x cm]            | 4 x 10 <sup>14</sup> |

| Order number |           |
|--------------|-----------|
| 8 940 107    | 5 liters  |
| 8 940 106    | 10 liters |

Suitable for the following units:

- JULABO Refrigerated Circulators
- JULABO Heating Circulators



-100 °C

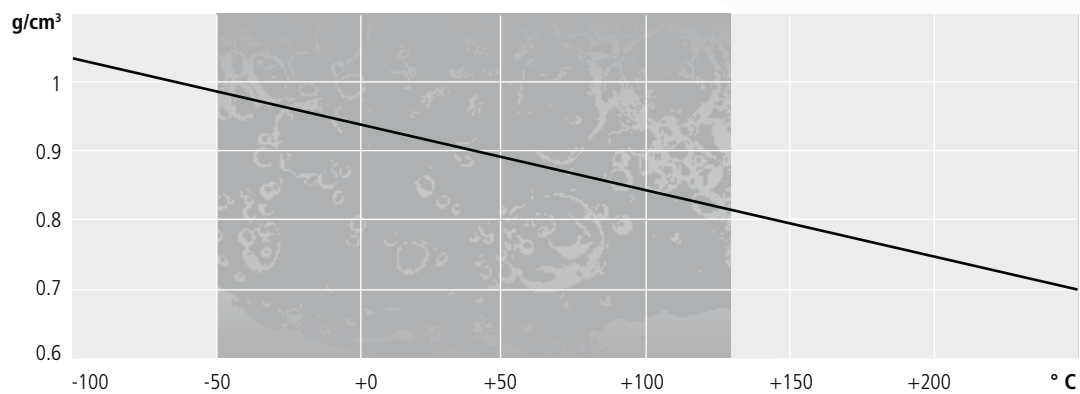
0 °C

+100 °C

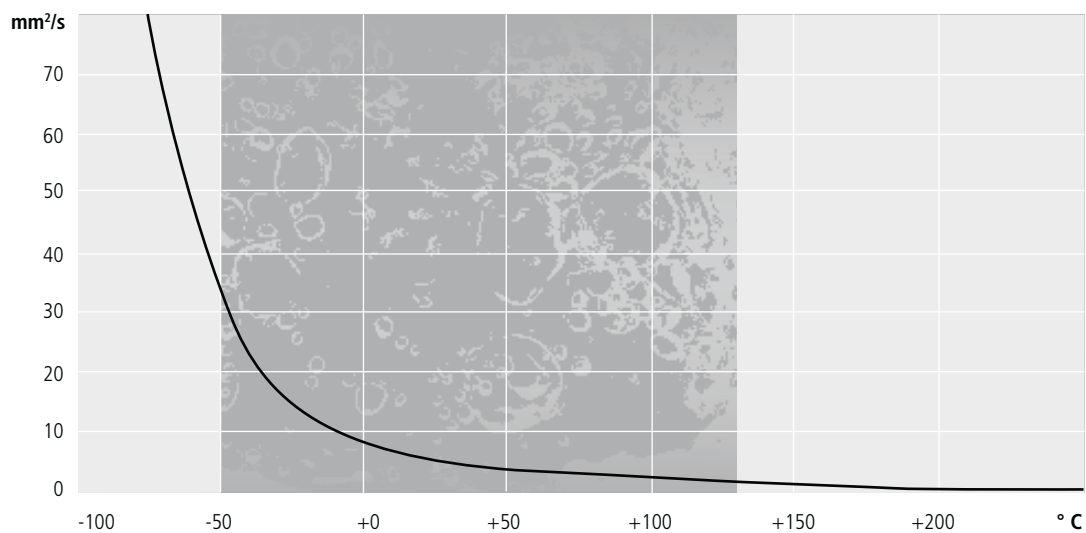


## Physical properties of Thermal H5

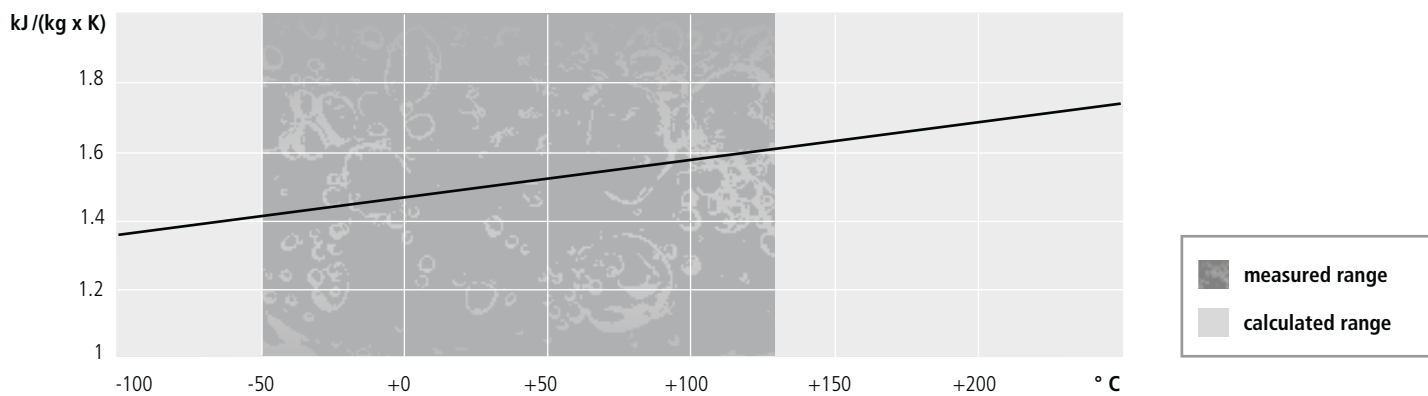
### Density



### Viscosity



### Specific heat capacity



+200 °C

+300 °C

+400 °C

## Bath fluid Thermal H10

JULABO Thermal H10 is a bath fluid based on silicone.

**Extended temperature range:** Thermal H10 can be used within the temperature range from -40°C to +180°C with circulators of the TopTech and HighTech series as well as CF31 and CF41.

**Do not use with silicone hoses!** Silicone-based bath fluids can swell and dissolve silicone hoses. Therefore use JULABO metal tubing or JULABO Viton tubing or JULABO PTFE tubing for the temperature control of external systems.

Please observe the information in our safety data sheet. You can download the safety data sheet at [www.julabo.com](http://www.julabo.com) or request it from JULABO.

### Advantages:

- High stability
- Low viscosity
- Good heat conductivity
- Minimum odor
- Low corrosion tendency
- Low toxicity
- Long fluid life

| Property  | Value                |
|---|----------------------|
| Working temperature °C                            | (-40) -20 ... +180   |
| Flash point °C                                    | >+170                |
| Fire point °C                                     | +220                 |
| Viscosity (kinematic at 20 °C) mm <sup>2</sup> /s | 10.8                 |
| Density (at 20 °C) g/cm <sup>3</sup>              | 0.94                 |
| Pour point °C                                     | <-60                 |
| Boiling point °C                                  | +288                 |
| Ignition temperature °C                           | +370                 |
| Color   | clear                |
| Thermal expansion coefficient K <sup>-1</sup>     | 0.00092              |
| Heat conductivity [W/(m x K)]                     | 0.14                 |
| Specific volume resistivity [Ohm x cm]            | 8 x 10 <sup>14</sup> |

| Order number |           |
|--------------|-----------|
| 8 940 115    | 5 liters  |
| 8 940 114    | 10 liters |

Suitable for the following units::

- JULABO Refrigerated Circulators
- JULABO Heating Circulators
- JULABO Chillers / Recirculating Coolers

Note the tip on  
page 32  
for the expansion  
of bath fluids in  
your application

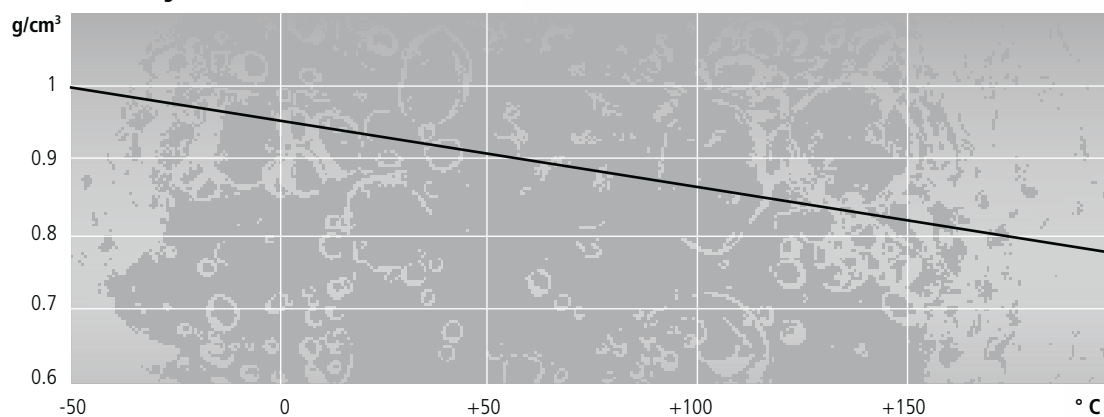
-100 °C

0 °C

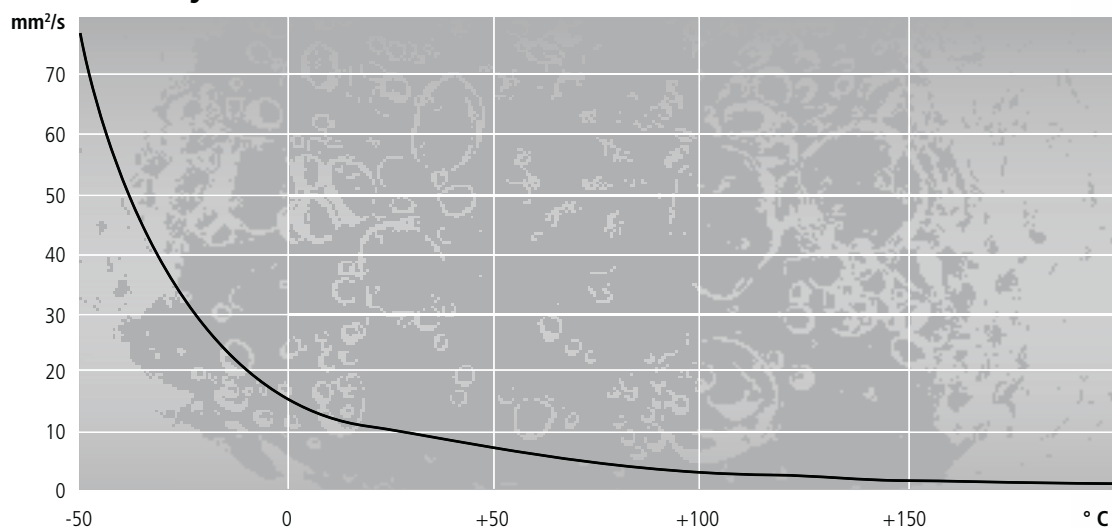
+100 °C

## Physical properties of Thermal H10

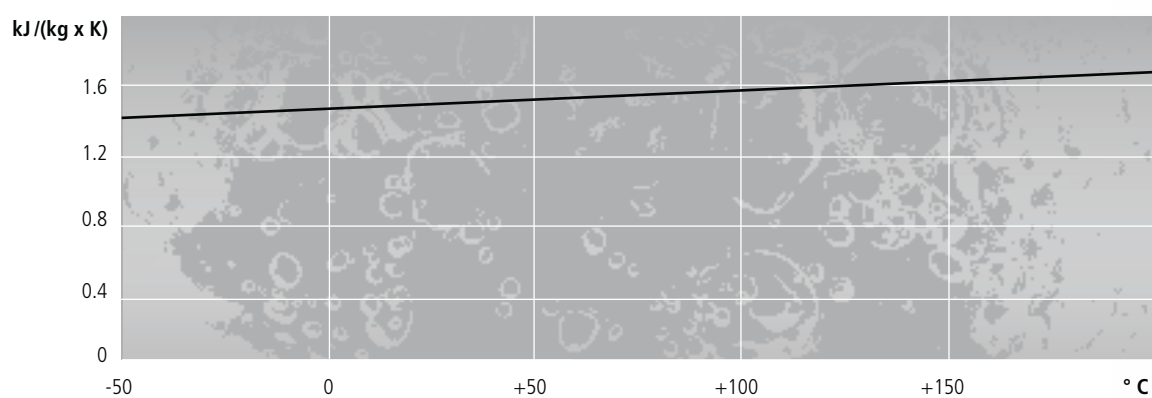
### Density



### Viscosity



### Specific heat capacity



measured range

+200 °C

+300 °C

+400 °C

## Bath fluid Thermal H20S

JULABO Thermal H20S is a bath fluid based on silicone.

**Do not use with silicone hoses!** Silicone-based bath fluids can swell and dissolve silicone hoses. Therefore use JULABO metal tubing or JULABO Viton tubing or JULABO PTFE tubing for the temperature control of external systems.

Please observe the information in our safety data sheet. You can download the safety data sheet at [www.julabo.com](http://www.julabo.com) or request it from JULABO.

### Advantages:

- With additional stabilizer
- Good heat conductivity
- Minimum odor
- Low Corrosion tendency
- Low toxicity
- Long fluid life

| Property  | Value                |
|---|----------------------|
| Working temperature °C                            | 0 ... +220           |
| Flash point °C                                    | +230                 |
| Fire point °C                                     | +264                 |
| Viscosity (kinematic at 20 °C) mm <sup>2</sup> /s | 22.3                 |
| Density (at 20 °C) g/cm <sup>3</sup>              | 0.95                 |
| Pour point °C                                     | -70                  |
| Boiling point °C                                  | +424                 |
| Ignition temperature °C                           | +385                 |
| Color   | light brown          |
| Thermal expansion coefficient K <sup>-1</sup>     | 0.00091              |
| Heat conductivity [W/(m x K)]                     | 0.14                 |
| Specific volume resistivity [Ohm x cm]            | 4 x 10 <sup>15</sup> |

| Order number |           |
|--------------|-----------|
| 8 940 109    | 5 liters  |
| 8 940 108    | 10 liters |

Suitable for the following units:

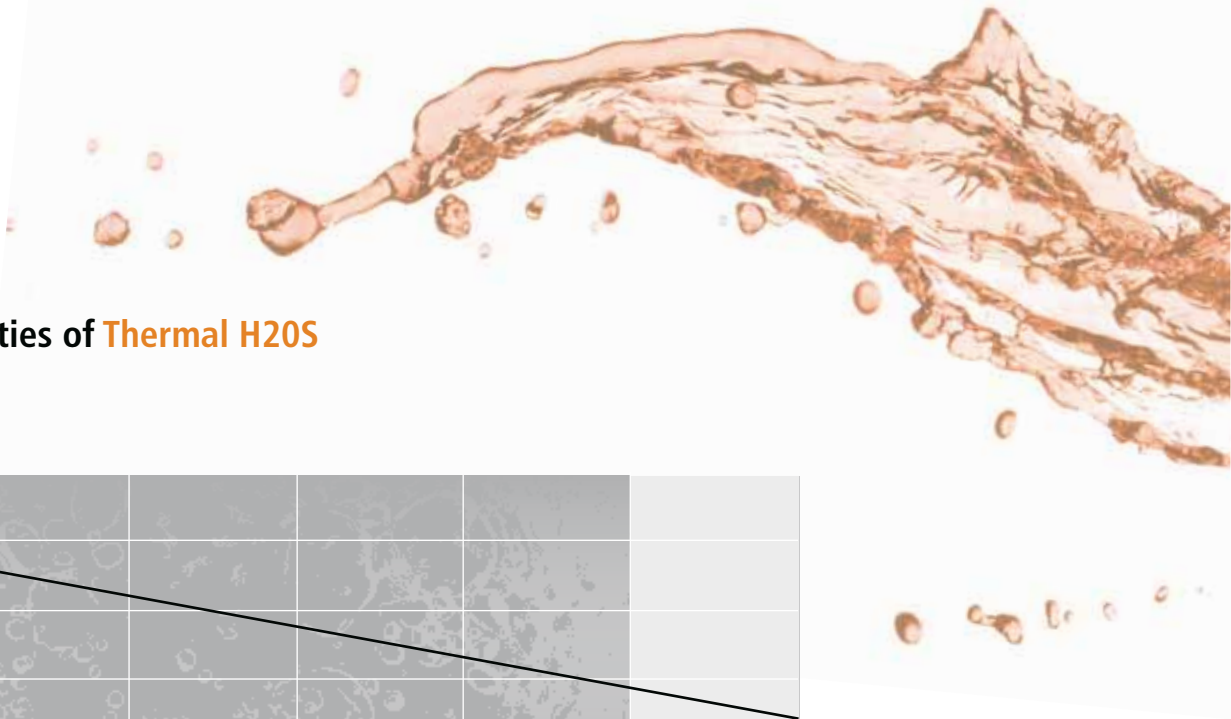
- JULABO Refrigerated Circulators
- JULABO Heating Circulators

Note the tip on  
page 32  
for the expansion  
of bath fluids in  
your application

-100 °C

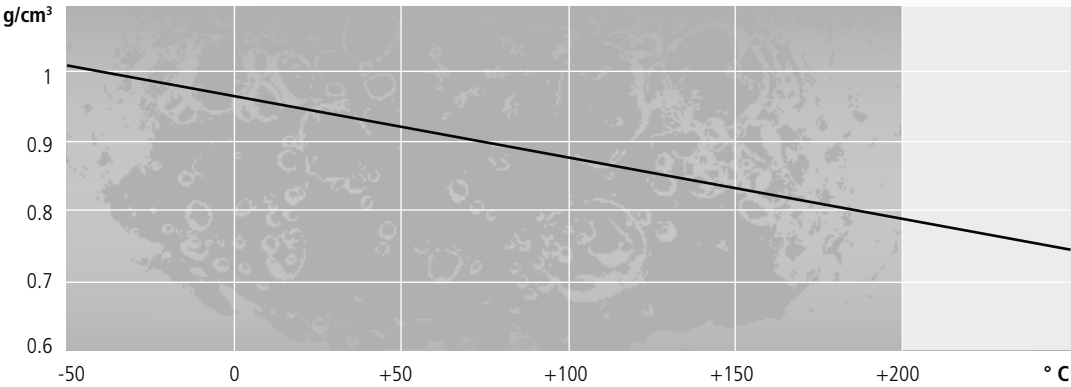
0 °C

+100 °C

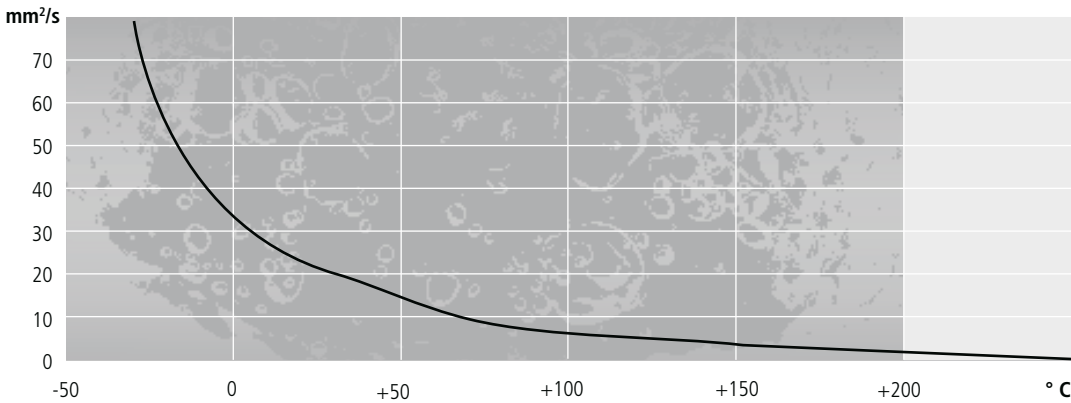


Physical properties of **Thermal H2O**S

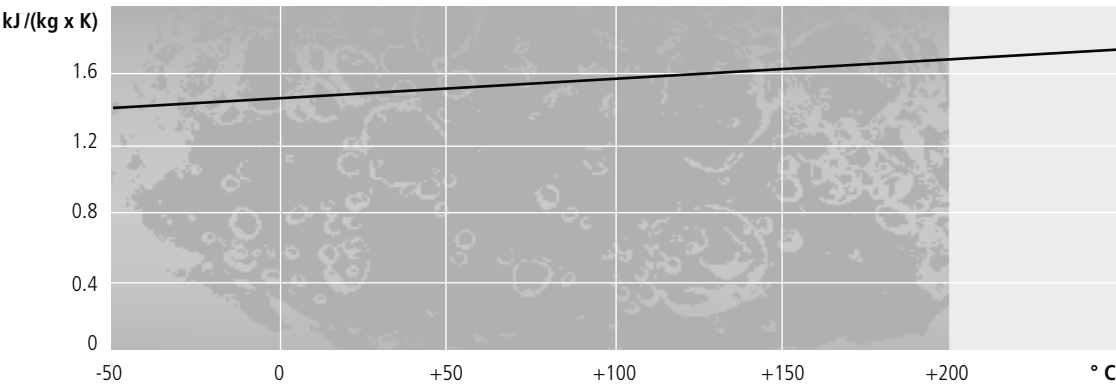
Density



Viscosity



Specific heat capacity



measured range

calculated range

+200 °C

+300 °C

+400 °C

## Bath fluid Thermal HL30

JULABO Thermal HL30 is a bath fluid based on water-glycol and features excellent thermal properties. In addition, JULABO Thermal HL30 supplies anti-freeze protection and thus it is most suitable for applications below the freezing point of water.

**Check the mixing ratio!** When using Thermal HL30 for long time periods, the mixing ratio of water to glycol must be checked regularly (50:50). In case of increased glycol content, the Thermal HL30 may become flammable. Conversely, increased water content may cause the Thermal HL30 to freeze at low temperatures.

Please observe the information in our safety data sheet. You can download the safety data sheet at [www.julabo.com](http://www.julabo.com) or request it from JULABO.

### Advantages:

- High stability
- Low viscosity
- Good heat conductivity
- Minimal odor
- Low corrosion tendency
- Low toxicity
- Long fluid life

| Property  | Value          |
|---|----------------|
| Working temperature °C                            | -30 ... +90    |
| Flash point °C                                    | not applicable |
| Fire point °C                                     | not applicable |
| Viscosity (kinematic at 20 °C) mm <sup>2</sup> /s | 4.07           |
| Density (at 20 °C) g/cm <sup>3</sup>              | 1.08           |
| Pour point °C                                     | -70            |
| Boiling point °C                                  | +108           |
| Ignition temperature °C                           | +430           |
| Color   | light yellow   |
| Thermal expansion coefficient K <sup>-1</sup>     | 0.0007         |
| Heat conductivity [W/(m x K)]                     | 0.153          |
| Specific volume resistivity [Ohm x cm]            | 200            |

| Order number |           |
|--------------|-----------|
| 8 940 139    | 5 liters  |
| 8 940 138    | 10 liters |

Suitable for following units:

- PRESTO™ A30
- PRESTO™ A40
- PRESTO™ W40
- PRESTO™ A45
- PRESTO™ A45t
- PRESTO™ W50
- PRESTO™ W50t

Note the tip on  
page 32  
for the expansion  
of bath fluids in  
your application

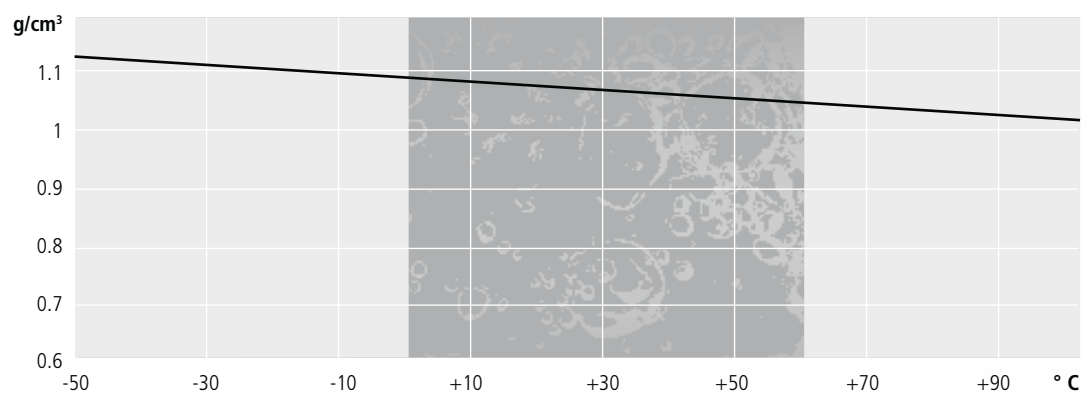
-100 °C

0 °C

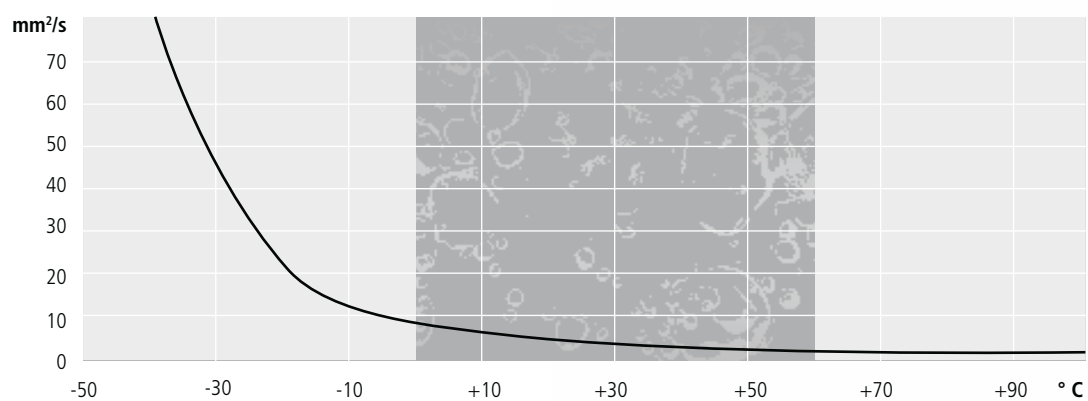
+100 °C

## Physical properties of Thermal HL30

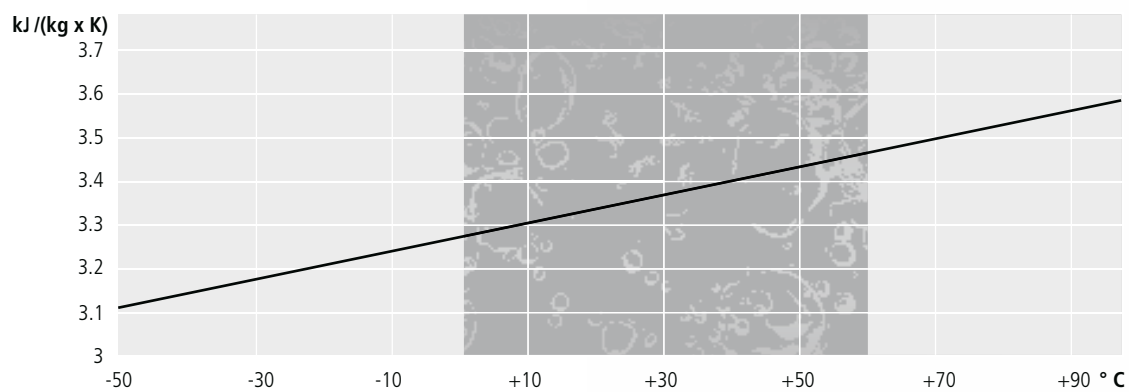
### Density



### Viscosity



### Specific heat capacity



■ measured range  
■ calculated range

+200  $^{\circ}\text{C}$

+300  $^{\circ}\text{C}$

+400  $^{\circ}\text{C}$

## Bath fluid Thermal HL60

JULABO Thermal HL60 is a bath fluid based on silicone with a wide working temperature range from -60 °C to +250 °C.

**Do not use with silicone hoses!** Silicone-based bath fluids can swell and dissolve silicone hoses. Therefore use JULABO metal tubing or JULABO Viton tubing or JULABO PTFE tubing for the temperature control of external systems.

Please observe the information in our safety data sheet. You can download the safety data sheet at [www.julabo.com](http://www.julabo.com) or request it from JULABO.

### Advantages:

- Wide temperature range
- High stability
- Low viscosity
- Good heat conductivity
- Minimal odor
- Low corrosion tendency
- Low toxicity
- Long fluid life

| Property  | Value                |
|---|----------------------|
| Working temperature °C                            | -60 ... +250         |
| Flash point °C                                    | +124                 |
| Fire point °C                                     | +142                 |
| Viscosity (kinematic at 20 °C) mm <sup>2</sup> /s | 5.66                 |
| Density (at 20 °C) g/cm <sup>3</sup>              | 0.92                 |
| Pour point °C                                     | -100                 |
| Boiling point °C                                  | +288                 |
| Ignition temperature °C                           | +350                 |
| Color   | clear                |
| Thermal expansion coefficient K <sup>-1</sup>     | 0.00094              |
| Heat conductivity [W/(m x K)]                     | 0.116                |
| Specific volume resistivity [Ohm x cm]            | 4 x 10 <sup>14</sup> |

| Order number |           |
|--------------|-----------|
| 8 940 141    | 5 liters  |
| 8 940 140    | 10 liters |

Suitable for the following units:

- PRESTO™



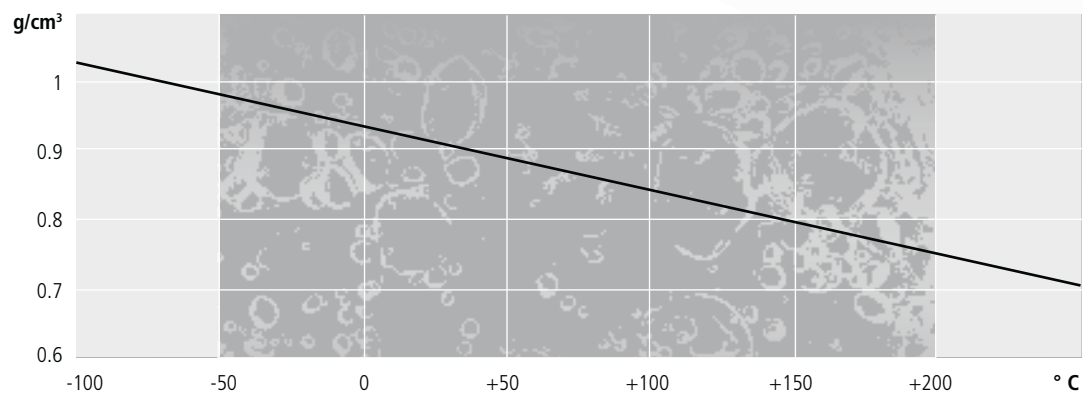
-100 °C

0 °C

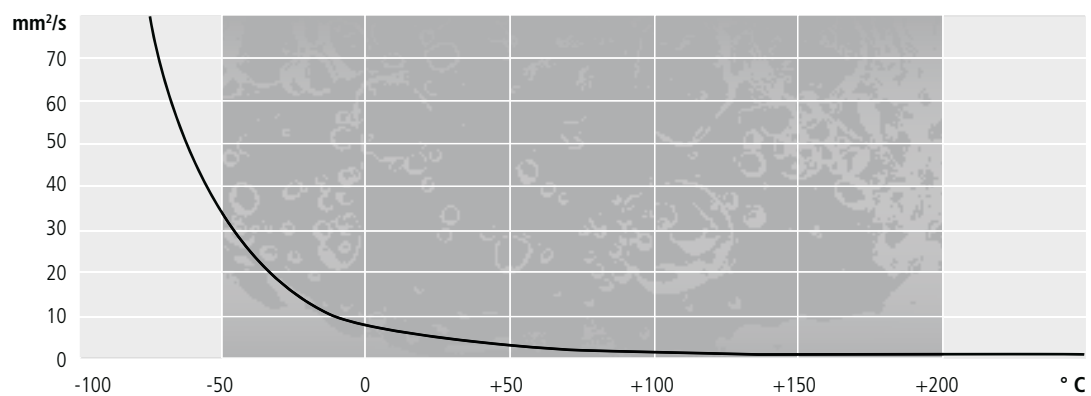
+100 °C

## Physical properties of Thermal HL60

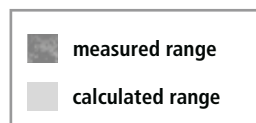
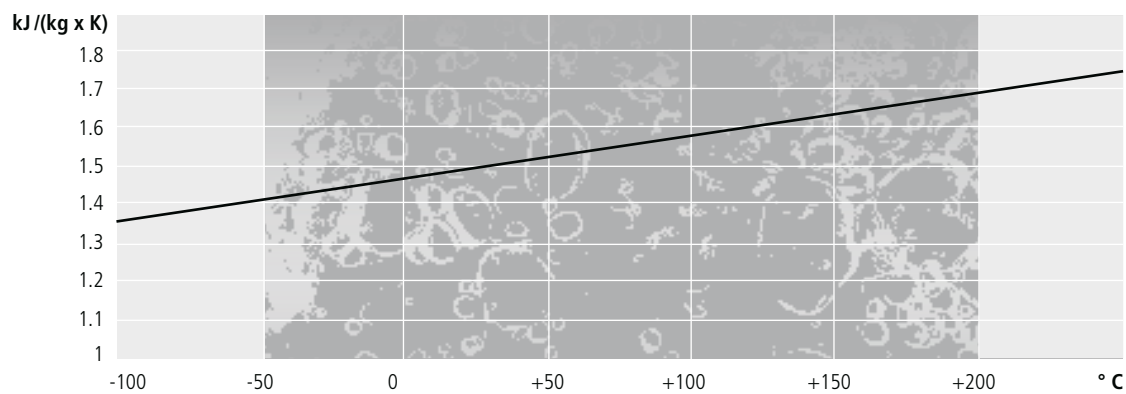
### Density



### Viscosity



### Specific heat capacity



+200  $^{\circ}\text{C}$

+300  $^{\circ}\text{C}$

+400  $^{\circ}\text{C}$

## Bath fluid Thermal HL80

JULABO Thermal HL80 is a bath fluid based on silicone with a wide working temperature range.

**Do not use with silicone hoses!** Silicone-based bath fluids can swell and dissolve silicone hoses. Therefore use JULABO metal tubing or JULABO Viton tubing or JULABO PTFE tubing for the temperature control of external systems.

Please observe the information in our safety data sheet. You can download the safety data sheet at [www.julabo.com](http://www.julabo.com) or request it from JULABO.

### Advantages:

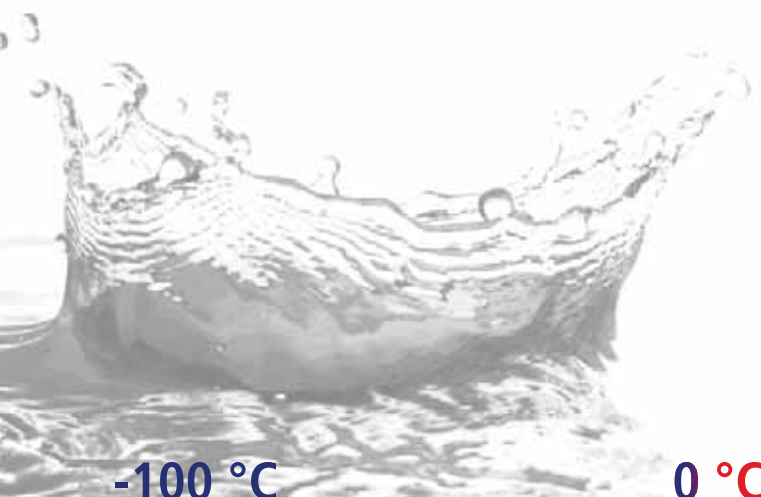
- Low toxicity
- Low viscosity
- High stability
- Minimum odor
- Good heat conductivity
- Low corrosion tendency
- Wide temperature range

| Property  | Value                |
|---|----------------------|
| Working temperature °C                            | -85 ... +170         |
| Flash point °C                                    | >+63                 |
| Fire point °C                                     | +112                 |
| Viscosity (kinematic at 20 °C) mm <sup>2</sup> /s | 3.21                 |
| Density (at 20 °C) g/cm <sup>3</sup>              | 0.89                 |
| Pour point °C                                     | <-108                |
| Boiling point °C                                  | +230                 |
| Ignition temperature °C                           | +335                 |
| Color   | clear                |
| Thermal expansion coefficient K <sup>-1</sup>     | 0.00097              |
| Heat conductivity[W/(m x K)]                      | 0.12                 |
| Specific volume resistivity [Ohm x cm]            | 4 x 10 <sup>14</sup> |

| Order number |           |
|--------------|-----------|
| 8 940 121    | 5 liters  |
| 8 940 120    | 10 liters |

Suitable for following units:

- PRESTO™



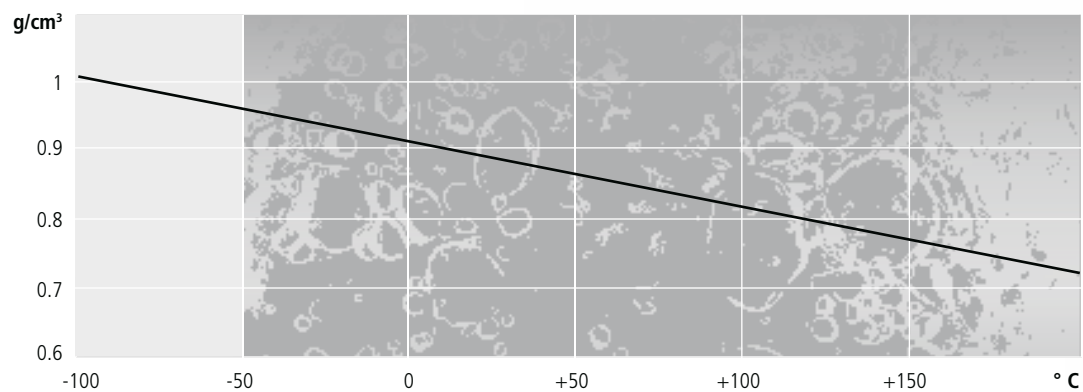
-100 °C

0 °C

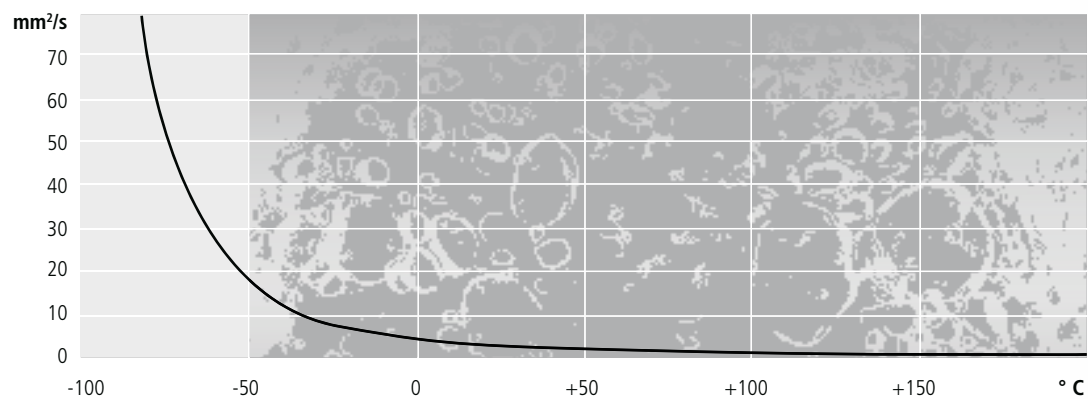
+100 °C

## Physical properties of Thermal HL80

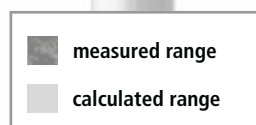
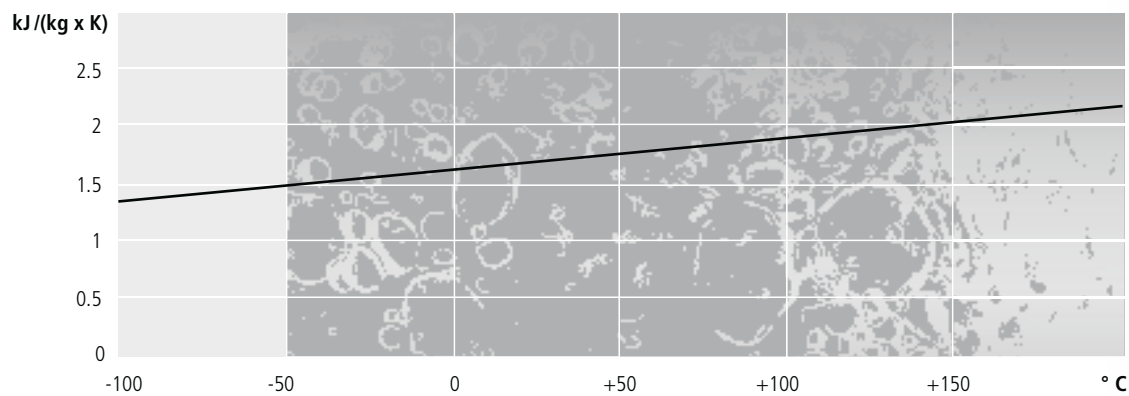
### Density



### Viscosity



### Specific heat capacity



+200  $^{\circ}\text{C}$

+300  $^{\circ}\text{C}$

+400  $^{\circ}\text{C}$

## Bath fluid Thermal H250S

JULABO Thermal H250S is a bath fluid based on silicone. It has a wide working temperature range and can be used for high temperatures up to +250 °C.

**Do not use with silicone hoses!** Silicone-based bath fluids can swell and dissolve silicone hoses. Therefore use JULABO metal tubing or JULABO Viton tubing or JULABO PTFE tubing for the temperature control of external systems.

Please observe the information in our safety data sheet. You can download the safety data sheet at [www.julabo.com](http://www.julabo.com) or request it from JULABO.

### Advantages

- Wide temperature range
- With additional stabilizer
- Good heat conductivity
- Minimal odor
- Low corrosion tendency
- Low toxicity
- Long fluid life

| Property  | Value                |
|---|----------------------|
| Working temperature °C                            | +20 ... +250         |
| Flash point °C                                    | +230                 |
| Fire point °C                                     | +264                 |
| Viscosity (kinematic at 20 °C) mm <sup>2</sup> /s | 22.3                 |
| Density (at 20 °C) g/cm <sup>3</sup>              | 0.95                 |
| Pour point °C                                     | -70                  |
| Boiling point °C                                  | +424                 |
| Ignition temperature °C                           | +385                 |
| Color   | light brown          |
| Thermal expansion coefficient K <sup>-1</sup>     | 0.00091              |
| Heat conductivity [W/(m x K)]                     | 0.14                 |
| Specific volume resistivity [Ohm x cm]            | 4 x 10 <sup>15</sup> |

| Order number |           |
|--------------|-----------|
| 8 940 133    | 5 liters  |
| 8 940 132    | 10 liters |

Suitable for following units:

- Forte HT

Note the tip on  
page 32  
for the expansion  
of bath fluids in  
your application

-100 °C

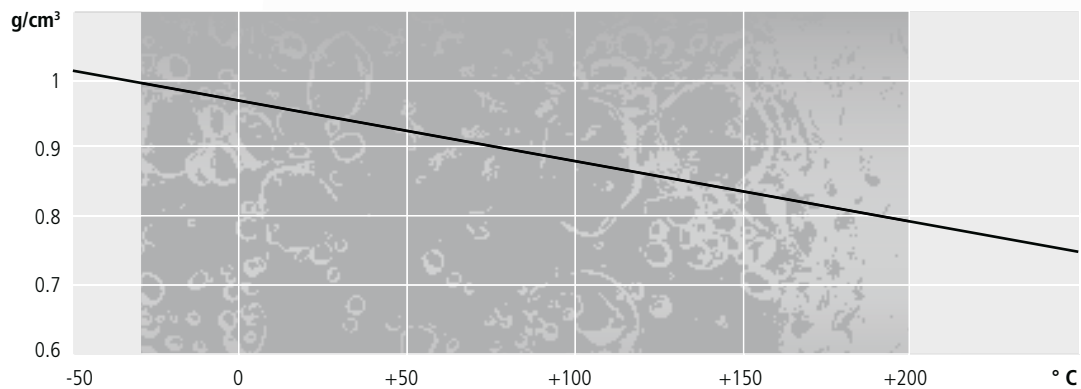
0 °C

+100 °C

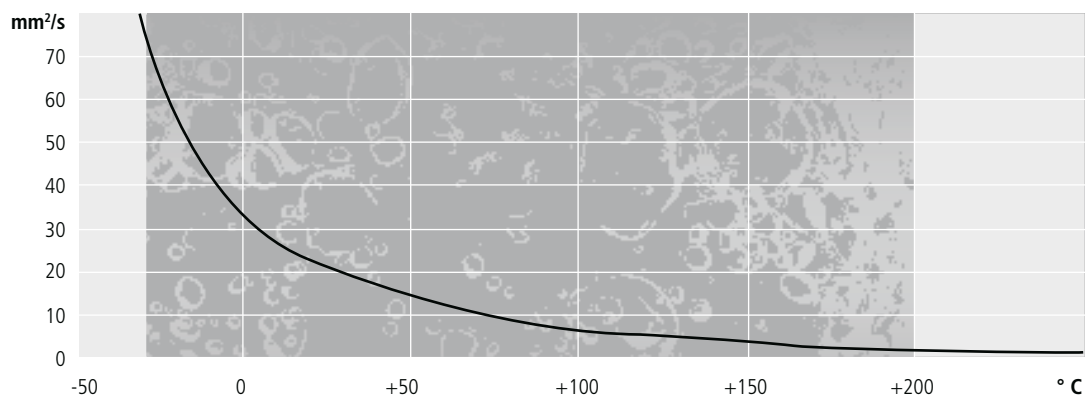


## Physical properties of Thermal H250S

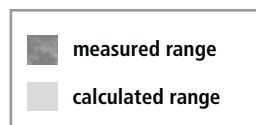
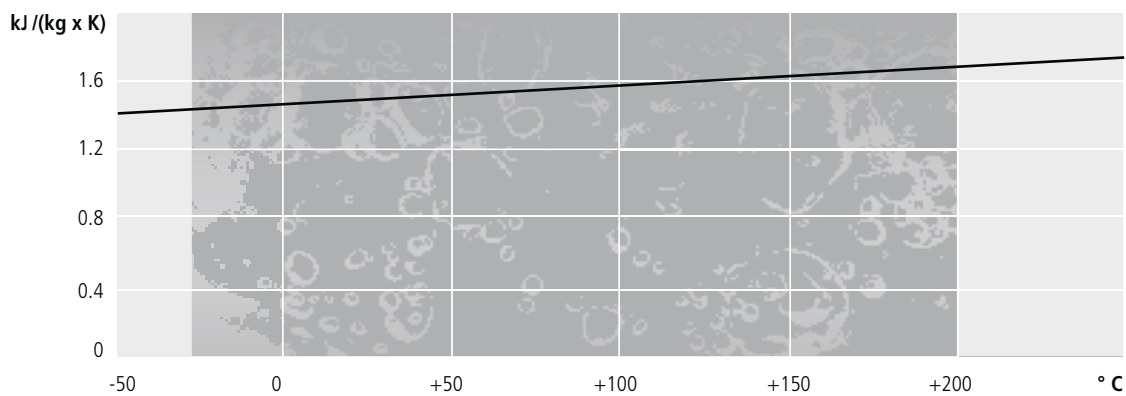
### Density



### Viscosity



### Specific heat capacity



+200 °C

+300 °C

+400 °C

## Bath fluid Thermal H335

JULABO Thermal H335 is a very stable hydrocarbon based bath fluid. It has a wide working temperature range and can be used for high temperatures up to +335 °C.

**Please note:** Usage of the fluid below the lowest mentioned working temperature may result in temperature fluctuation or high temperature alarm due to hot fluid areas around the heater. Recommendation: Reduce the heater capacity during heating up until the lowest mentioned working temperature is reached.

**Use of silicone hoses:** Silicone hoses are suitable only for limited use with liquids based on hydrocarbons as their plasticizer dissolves and the hoses become brittle. Especially at high temperatures this may entail risk of injury.

Please observe the information in our safety data sheet. You can download the safety data sheet at [www.julabo.com](http://www.julabo.com) or request it from JULABO.

### Advantages:

- Wide temperature range
- Very high stability
- Good heat conductivity
- Minimal odor
- Low corrosion tendency
- Low toxicity
- Long fluid life

| Property  | Value                |
|---|----------------------|
| Working temperature °C                            | +40 ... +335         |
| Flash point °C                                    | +184                 |
| Fire point °C                                     | +190                 |
| Viscosity (kinematic at 20 °C) mm <sup>2</sup> /s | 131                  |
| Density (at 20 °C) g/cm <sup>3</sup>              | 1.01                 |
| Pour point °C                                     | -32                  |
| Boiling point °C                                  | +340                 |
| Ignition temperature °C                           | +373                 |
| Color   | light yellow         |
| Thermal expansion coefficient K <sup>-1</sup>     | 0.00068              |
| Heat conductivity [W/(m x K)]                     | 0.116                |
| Specific volume resistivity [Ohm x cm]            | 4 x 10 <sup>14</sup> |

| Order number |           |
|--------------|-----------|
| 8 940 131    | 5 liters  |
| 8 940 130    | 10 liters |

Suitable for following units:  
- Forte HT

Note the tip on  
page 32  
for the expansion  
of bath fluids in  
your application

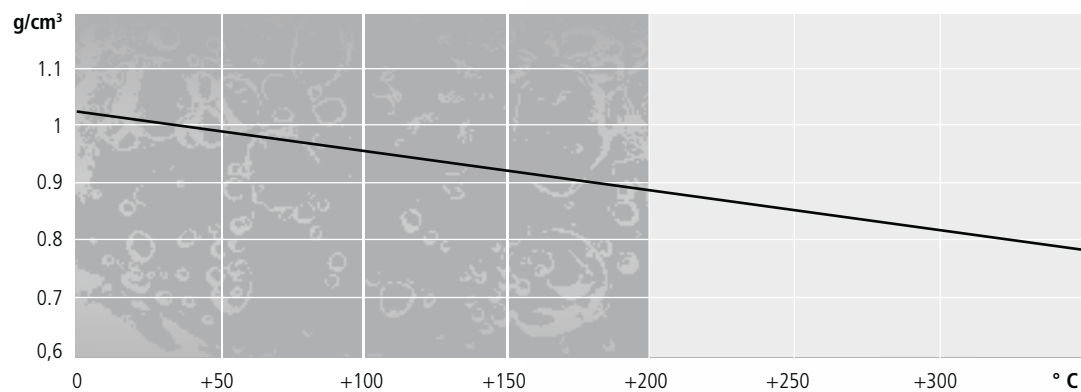
-100 °C

0 °C

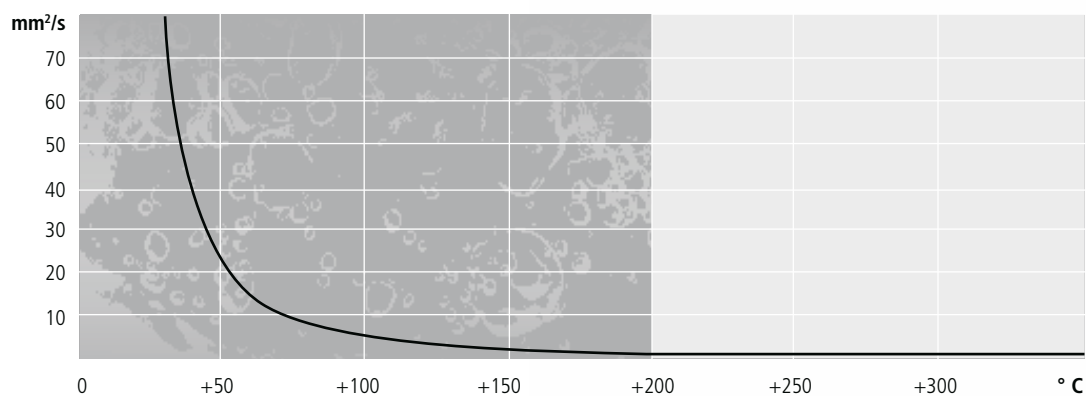
+100 °C

## Physical properties of Thermal H335

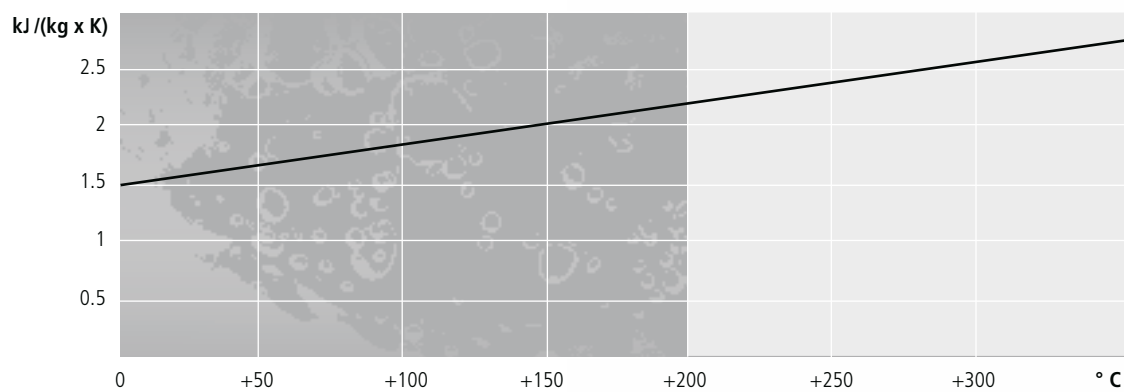
### Density



### Viscosity



### Specific heat capacity



■ measured range  
■ calculated range

+200 °C

+300 °C

+400 °C

## Bath fluid Thermal H350

JULABO Thermal H350 is a very stable hydrocarbon based bath fluid. It has a wide working temperature range and can be used for high temperatures up to +350 °C.

**Please note:** Usage of the fluid below the lowest mentioned working temperature may result in temperature fluctuation or high temperature alarm due to hot fluid areas around the heater. Recommendation: Reduce the heater capacity during heating up until the lowest mentioned working temperature is reached.

**Use of silicone hoses:** Silicone hoses are suitable only for limited use with liquids based on hydrocarbons as their plasticizer dissolves and the hoses become brittle. Especially at high temperatures this may entail risk of injury.

Please observe the information in our safety data sheet. You can download the safety data sheet at [www.julabo.com](http://www.julabo.com) or request it from JULABO.

### Advantages:

- Wide temperature range
- Very high stability
- Good heat conductivity
- Minimal odor
- Low corrosion tendency
- Low toxicity
- Long fluid life

| Property  | Value                  |
|---|------------------------|
| Working temperature °C                            | +50 ... +350           |
| Flash point °C                                    | +200                   |
| Fire point °C                                     | +235                   |
| Viscosity (kinematic at 20 °C) mm <sup>2</sup> /s | 48.3                   |
| Density (at 20 °C) g/cm <sup>3</sup>              | 1.04                   |
| Pour point °C                                     | -34                    |
| Boiling point °C                                  | +371                   |
| Ignition temperature °C                           | +450                   |
| Color   | clear                  |
| Thermal expansion coefficient K <sup>-1</sup>     | 0.0008                 |
| Heat conductivity [W/(m x K)]                     | 0.131                  |
| Specific volume resistivity [Ohm x cm]            | 1.6 x 10 <sup>15</sup> |

### Order number

|           |          |
|-----------|----------|
| 8 940 111 | 5 liters |
|-----------|----------|

Suitable for following units:  
- Forte HT

Note the tip on  
page 32  
for the expansion  
of bath fluids in  
your application

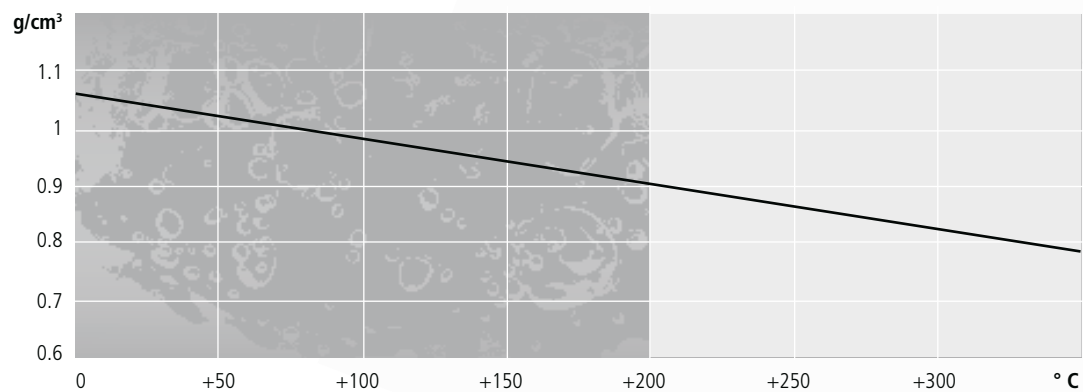
-100 °C

0 °C

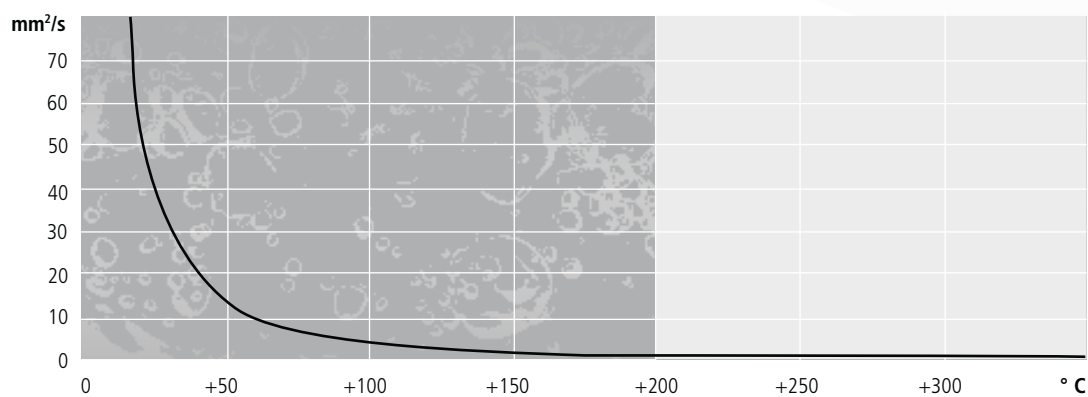
+100 °C

## Physical properties of Thermal H350

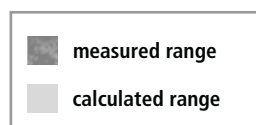
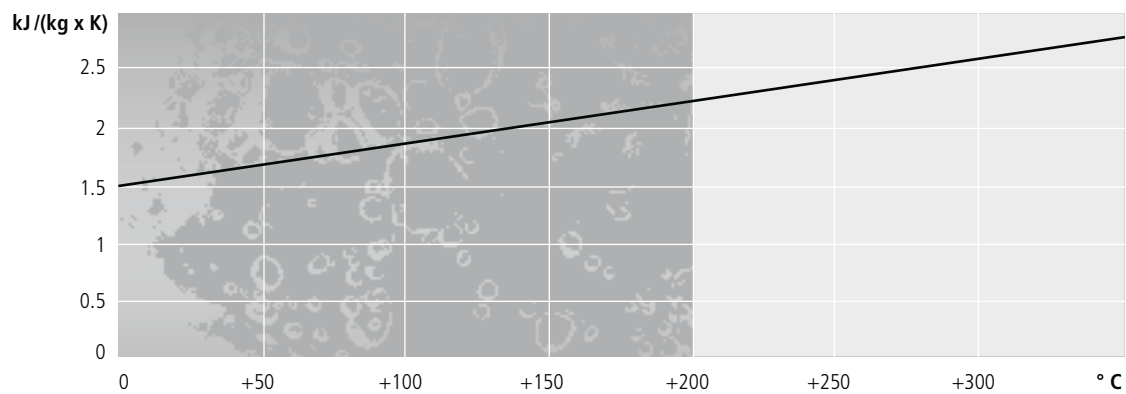
### Density



### Viscosity



### Specific heat capacity



+200  $^{\circ}\text{C}$

+300  $^{\circ}\text{C}$

+400  $^{\circ}\text{C}$

## Water bath protective media AQUA STABIL

JULABO AQUA STABIL is a water disinfectant for open baths. It prevents the pollution of the bath fluid and stops the growths of algae, bacteria, and other microorganisms with its germicidal effectiveness. It increases the service life of water used for temperature control.

Application: Add 2 ml AQUA STABIL per 1 liter of water. Change the water every three months even if the blue coloration has not faded. If the coloration fades before three months, exchange the water and AQUA STABIL immediately.

Please observe the information in our safety data sheet. You can download the safety data sheet at [www.julabo.com](http://www.julabo.com) or request it from JULABO.



### Advantages:

- excellent heat conductivity
- minimum odor
- low corrosion tendency
- low toxicity

| Property               | Value       |
|------------------------|-------------|
| Working temperature °C | +20 ... +80 |

| Order number |                         |
|--------------|-------------------------|
| 8 940 006    | 6 bottles, 100 ml each  |
| 8 940 012    | 12 bottles, 100 ml each |

Suitable for the following units:

- JULABO Heating Circulators (bath fluid: water)
- JULABO Water Baths
- JULABO Shaking Water Baths

-100 °C

0 °C

+100 °C

## TERMINOLOGY

for JULABO Thermal Bath Fluids

The recommended **working temperature range** defines the lowest and the highest temperature for the use of the respective bath fluid. Exact and stable operation of your JULABO unit is guaranteed within the given range over a long period.

The **specific heat capacity** is the thermal energy required to raise the temperature of 1 kg of liquid by 1 K.

**Viscosity** indicates the flow characteristics of the bath fluid and it is very dependant on temperature. When operating a JULABO unit, the viscosity has a decisive influence on the temperature stability and the pump capacity.

The **firepoint** is the temperature at which bath fluids continue to burn after ignition (>5 sec). According to standard, the maximum working temperature must always be 25 °C below the fire point. (Exemption: Closed systems by JULABO).

The **flash point** is the lowest temperature at which emerging vapors can temporarily ignite (<5 sec). The highest operating temperature specifications for JULABO bath fluids are always below the flash point and therefore exclude these risks. (Exemption: Closed systems by JULABO)

The **boiling point** is the temperature at which a liquid begins to boil (referring to an ambient pressure of 1 bar).

The **ignition temperature** is the lowest temperature at which the bath fluid ignites spontaneously and continues to burn without heat supply.

In **closed systems** by JULABO there is no contact between the bath fluid and oxygen in ambient air. Therefore, the flash and fire point indicated for these systems can be easily exceeded. Due to its construction, contact to ambient air cannot be avoided in the internal expansion tank. To avert the danger of ignition, the expansion tank of JULABO units is actively cooled (cold oil superimposition).



+200 °C

+300 °C

+400 °C

## Tip

Use the thermal coefficient of expansion to define the expansion of the bath fluid in your application. Based on your average working temperature you can define the average density (see the diagram 'density' of the relevant bath fluid). Now you can use the formula listed below to calculate the expansion. The result will help you when sizing an expansion vessel.

### Please note!

The filling volume is more than just the volume in the JULABO unit. The volume in the external application and fluid hoses should also be considered in this calculation.

### Formula:

$$\Delta V = \frac{\beta \times \Delta T \times V_0}{D_{\text{average}}}$$

$\Delta V$  = change of volume

$\beta$  = Thermal expansion coefficient

$\Delta T$  = Working temperature difference  
(Difference from  $t_1$  final temperature -  $t_0$  starting temperature)

$V_0$  = Filling volume

$D_{\text{mittel}}$  = medium density (readable at  $t_{\text{average}}$ )

Thermal expansion coefficient  
g/ml/K

0,00094

0.116

### Example calculation:

What is the volume of 20 L of Thermal HL40 when heated from -20 °C to +70 °C?

$V_0$  = 20 liters

$t_0$  = -20 °C

$t_1$  = +70 °C

$\Delta T$  = 90 K

$\beta$  = as shown in the table

$D_{\text{average}}$  = as shown in the graphic

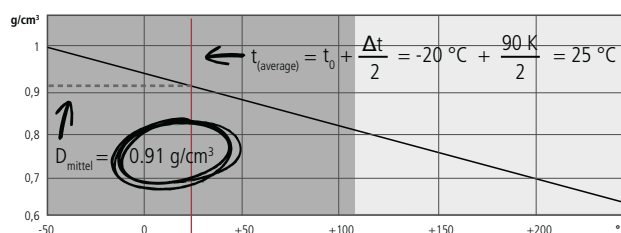
$\Delta t = t_1 - t_0 = +70 \text{ °C} - (-20 \text{ °C}) = 90 \text{ K}$

Change of volume:

$$\frac{0,00094 \text{ g/ml/K} \times 90 \text{ K} \times 20 \text{ liters}}{0.91 \text{ g/cm}^3} = 1.86 \text{ liters}$$

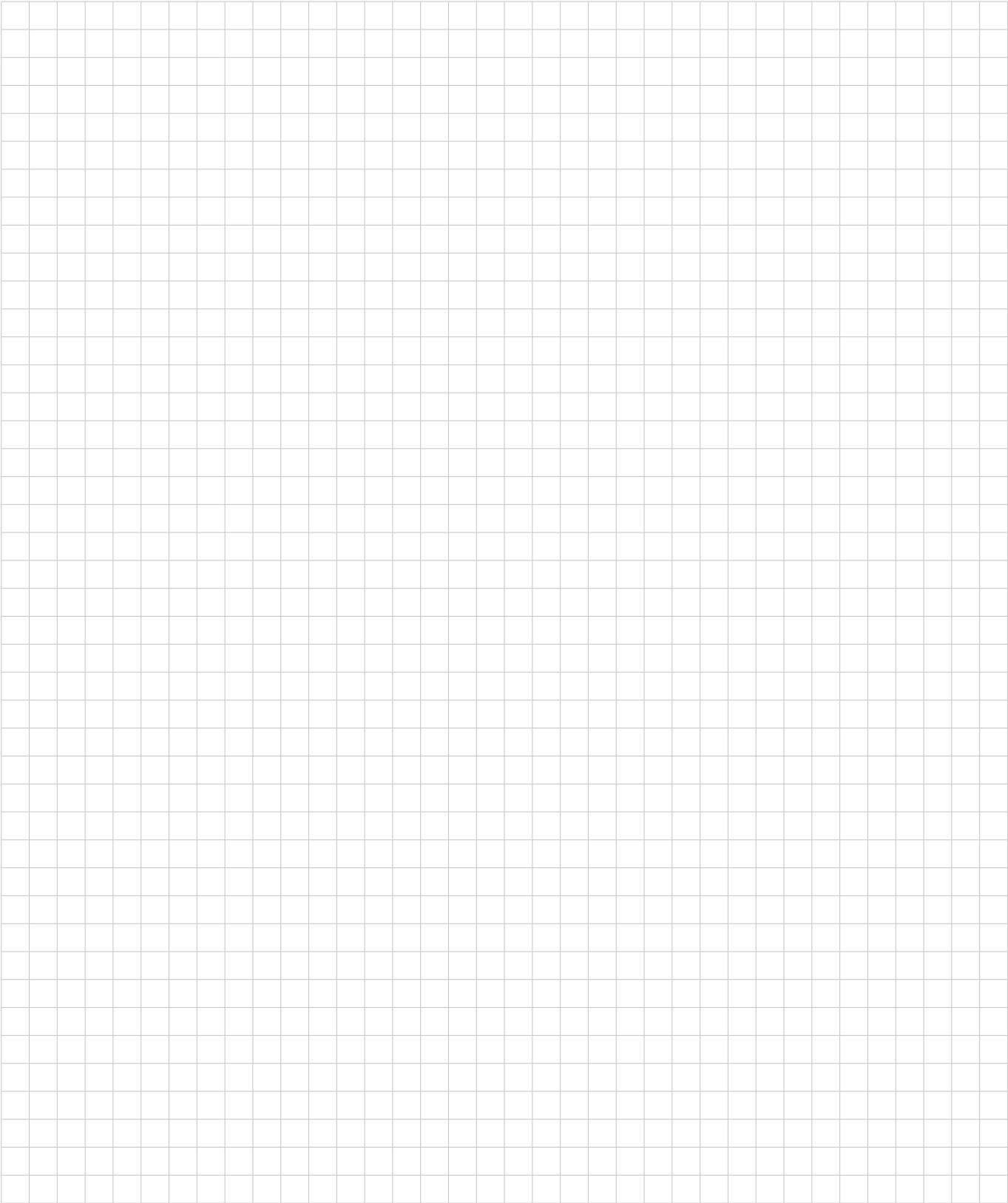
The volume will expand by almost 2 liters.

### Density Thermal HL40





Notes



+200 °C

+300 °C

+400 °C

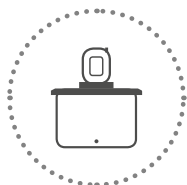
## JULABO temperature control – high-precision and speed

JULABO products include high-quality temperature control solutions to cover the temperature range from -95 to +400 °C.



### Refrigerated Circulators

The JULABO refrigerated circulators are suitable for internal and external applications and can be used within the temperature range of -95 to +200 °C.



### Heating Circulators

Heating circulators are available in various designs including Heating Immersion Circulators, Open Heating Bath Circulators, or Heating Circulators and cover the temperature range from +20 to +300 °C.



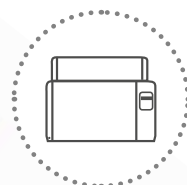
### Highly Dynamic Temperature Control Systems

The highly dynamic temperature control systems from JULABO can be used for demanding temperature applications ranging from -92 to +400 °C. The new PRESTO line offers unique high performance specifications to meet these requirements.



### Recirculating Coolers

JULABO recirculating coolers are highly efficient and therefore offer an environmentally friendly and economic alternative to tap water cooling in the range of -25 to +130 °C.



### Water Baths and Shaking Water Baths

Water baths and shaking water baths from JULABO can be used for a variety of applications in the temperature range from +20 to +99.9 °C

-100 °C

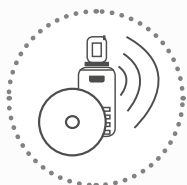
0 °C

+100 °C



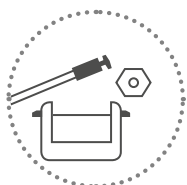
### **Additional products**

In addition, the JULABO product portfolio has equipment for special applications such as Calibration Baths, Visco Baths, Forcing Test Refrigerated-Heating Circulating Bath, Immersion Coolers, Laboratory Temperature Controllers and Refrigerators for Chemicals.



### **Wireless Communication & Software Solutions**

JULABO facilitates the automation of applications. The temperature control units can be comfortably controlled and monitored via PC.



### **Accessories**

The extensive range of accessories for all our devices allows the flexible use of JULABO products in research and industry.

### **Comprehensive service and on-site support**

JULABO takes pride in offering customers expert advice for pairing the proper JULABO temperature control solution to their specific application. JULABO service and support options include installation and calibration, equipment qualification documentation and application training. These invaluable services ensure customer confidence in the operation and maintenance of their JULABO unit.

### **Individual requirements – individual products**

The wide range of JULABO offers a solution for almost any application. However, if a specific application needs more than a standard product is able to offer, the JULABO specialists will work out an individual solution with you.



**+200 °C**

**+300 °C**

**+400 °C**



# **Julabo**

THE TEMPERATURE CONTROL COMPANY

## **GERMANY** Headquarters

**JULABO GmbH**  
Gerhard-Juchheim-Strasse 1  
77960 Seelbach  
Germany

Tel. +49 (0) 7823 51-0  
Fax +49 (0) 7823 24 91  
info.de@julabo.com  
www.julabo.com

**ITALY**  
JULABO Italia Srl.  
www.julabo.com

**UK**  
JULABO UK, Ltd.  
www.julabo.com

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