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The Thermal Bath Fluids

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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 12 months and longer 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...

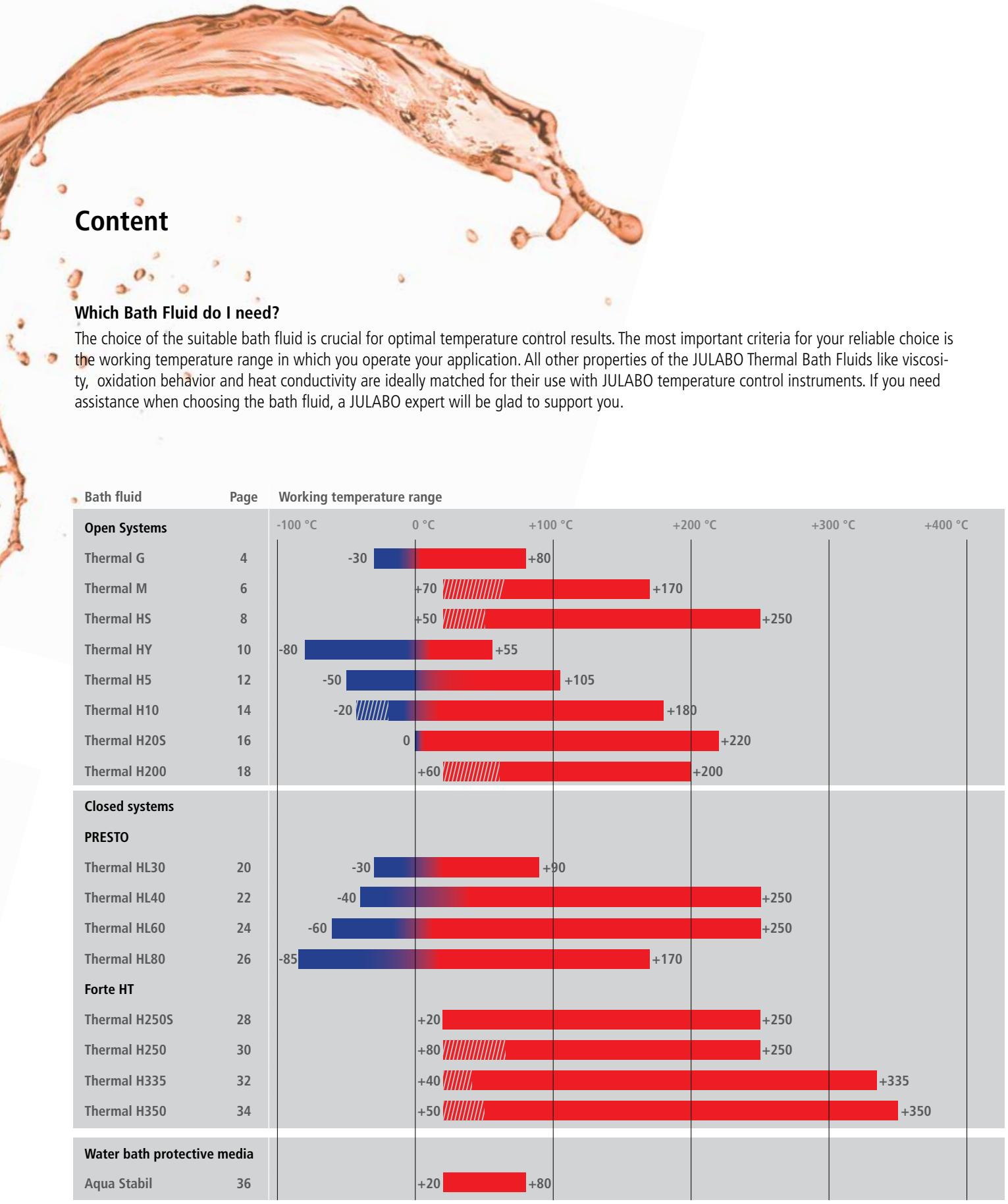
...(Monoethylene glycol with anti-corrosion additives) have excellent thermal characteristics and a low viscosity. In addition they provide anti-freeze protection, i.e. they can be applied at temperatures below the freezing point of water.
Observe the mixing ratio! When using water-glycol based bath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



+200 °C +300 °C +400 °C

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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 or request it from JULABO.

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

Advantages:

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

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

Suitable for the following units:

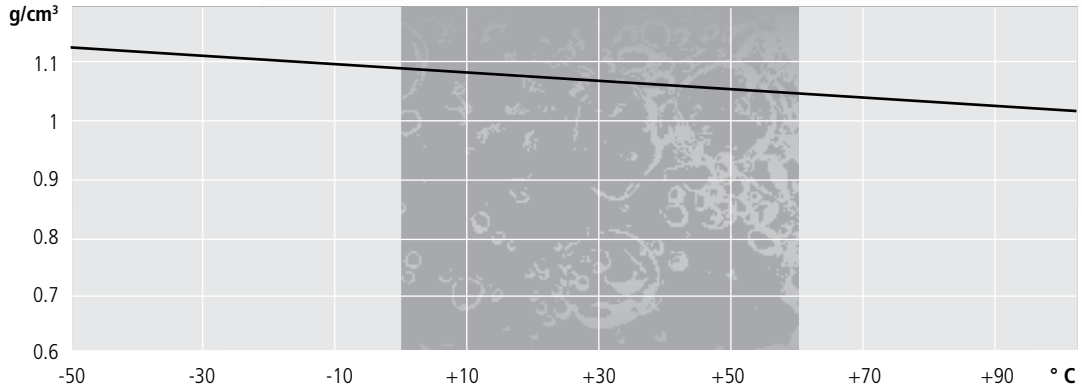
- JULABO Refrigerated Circulators
- JULABO Heating Circulators
- JULABO Chillers/Recirculating Coolers

Note the tip on page 38 for the expansion of bath fluids in your application

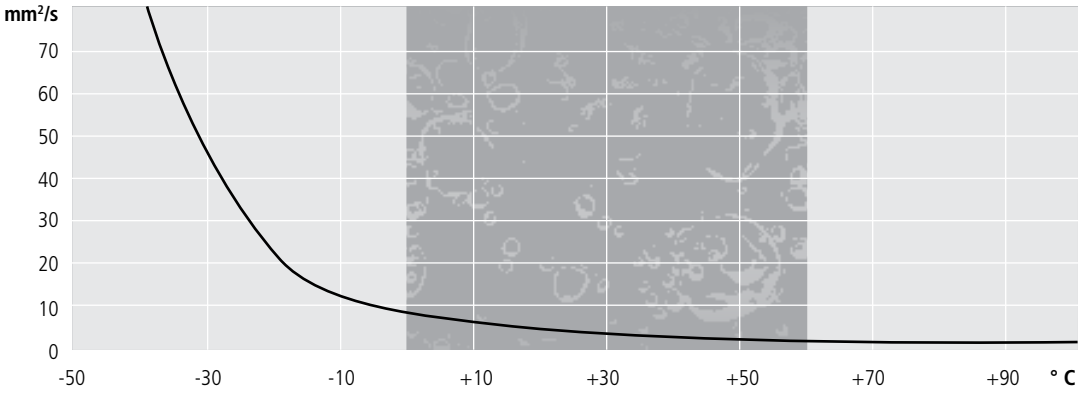
-100 °C 0 °C +100 °C

Physical properties of Thermal G

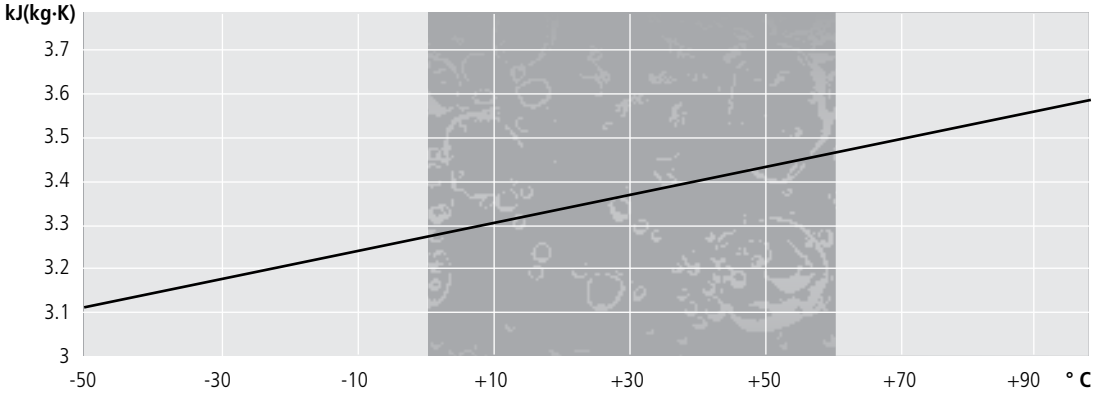
Density

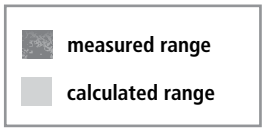


Viscosity



Specific heat capacity





+200 °C **+300 °C** **+400 °C**

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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 or request it from JULABO.

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

Advantages:

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

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

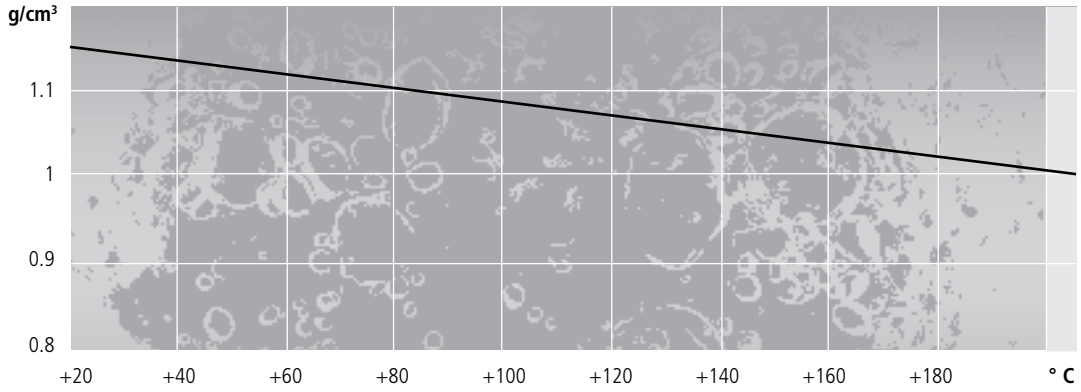
Suitable for the following units:
- JULABO Heating Circulators

Note the tip on page 38 for the expansion of bath fluids in your application

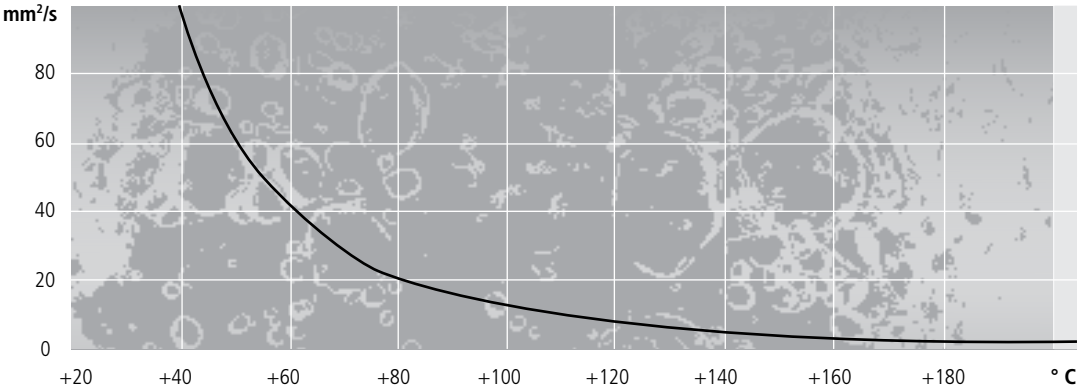
-100 °C 0 °C +100 °C

Physical properties of Thermal M

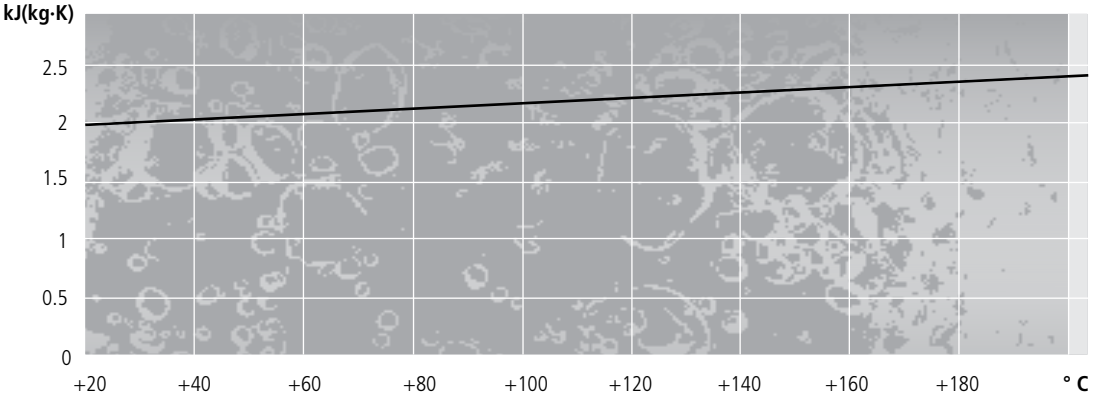
Density

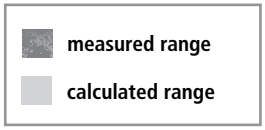


Viscosity



Specific heat capacity





+200 °C +300 °C +400 °C

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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 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^2/s	55
Density (at 20 °C) g/cm^3	0.96
Pour point °C	<-60
Boiling point °C	+246
Ignition temperature °C	>+400
Color	light brown
Thermal expansion coefficient K^{-1}	0.00089
Heat conductivity [W/(m·K)]	0.153
Specific volume resistivity [Ohm*cm]	$6 \cdot 10^{14}$

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

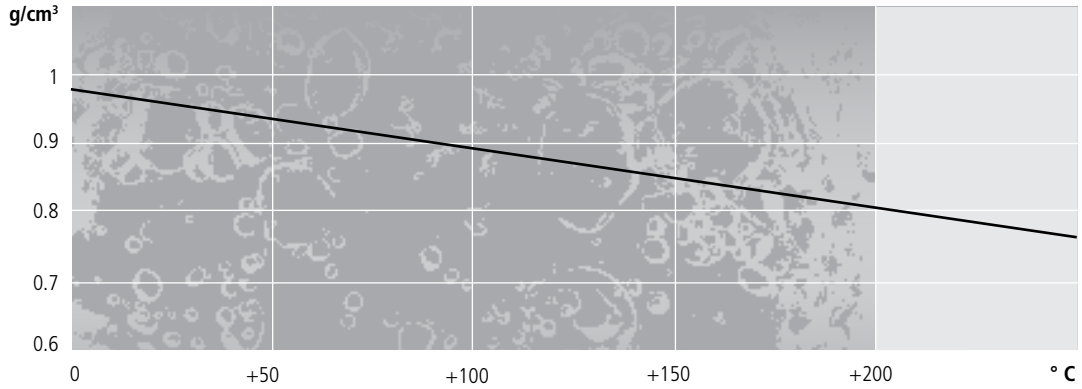
Suitable for the following units:
- JULABO Heating Circulators
- JULABO Refrigerated Circulators

Note the tip on page 38 for the expansion of bath fluids in your application

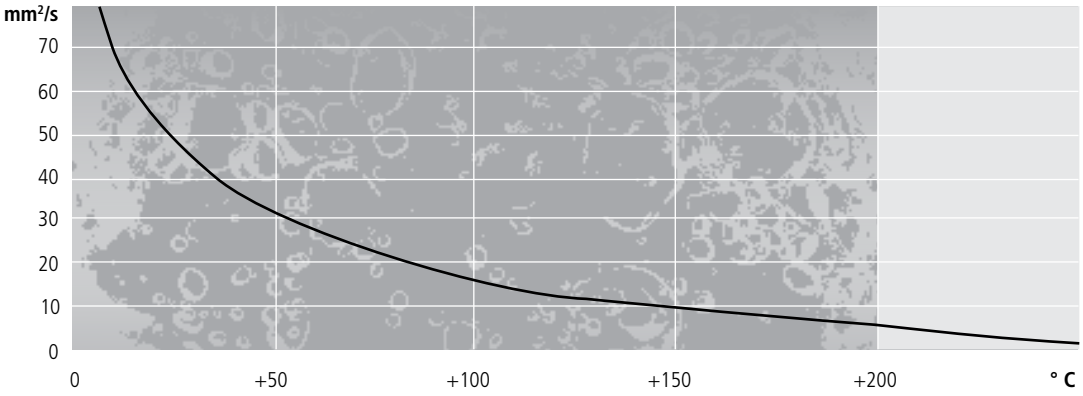
-100 °C 0 °C +100 °C

Physical properties of Thermal HS

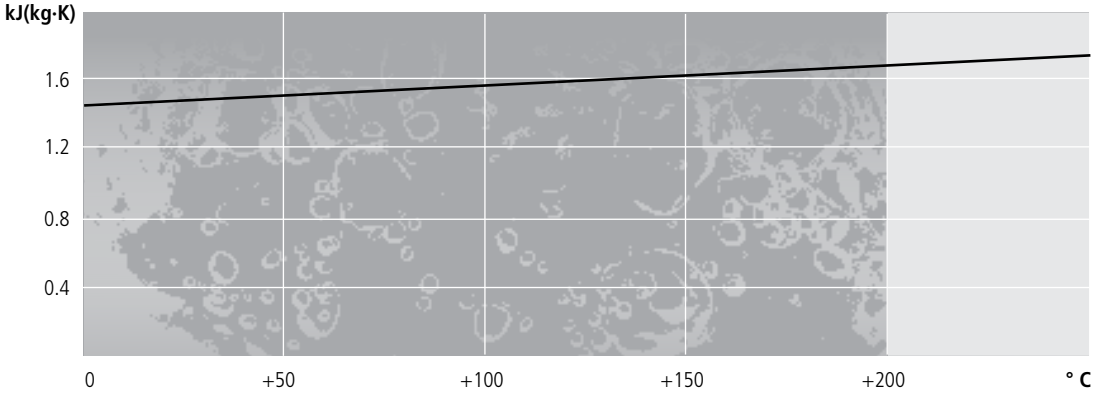
Density

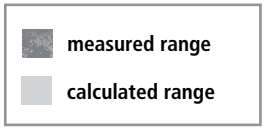


Viscosity



Specific heat capacity





+200 °C +300 °C +400 °C

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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 or request it from JULABO.

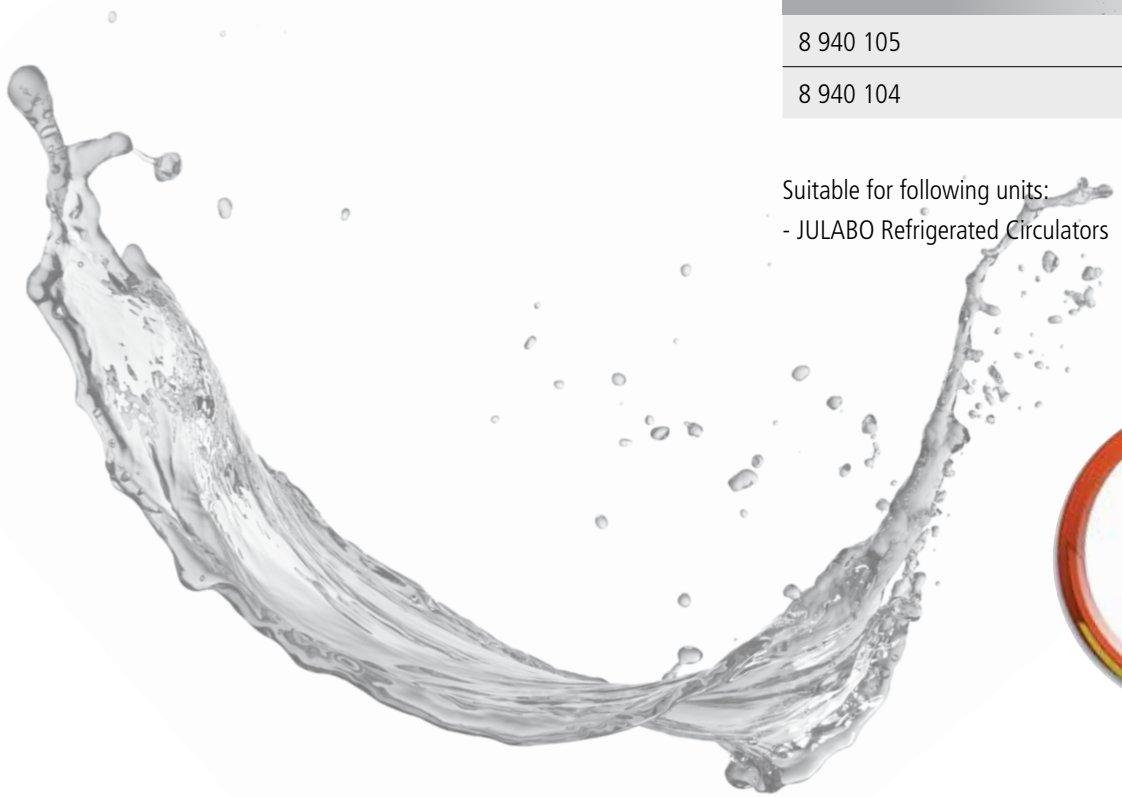
Property	Value
Working temperature °C	-80 … +55
Flash point °C	+62
Fire point °C	+80
Viscosity (kinematic at 20 °C) mm^2/s	<4
Density (at 20 °C) g/cm^3	0.9
Pour point °C	-100
Boiling point °C	+228.5
Ignition temperature °C	+335
Color	clear
Thermal expansion coefficient K^{-1}	0.00098
Heat conductivity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

Advantages:

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

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

Suitable for following units:
- JULABO Refrigerated Circulators

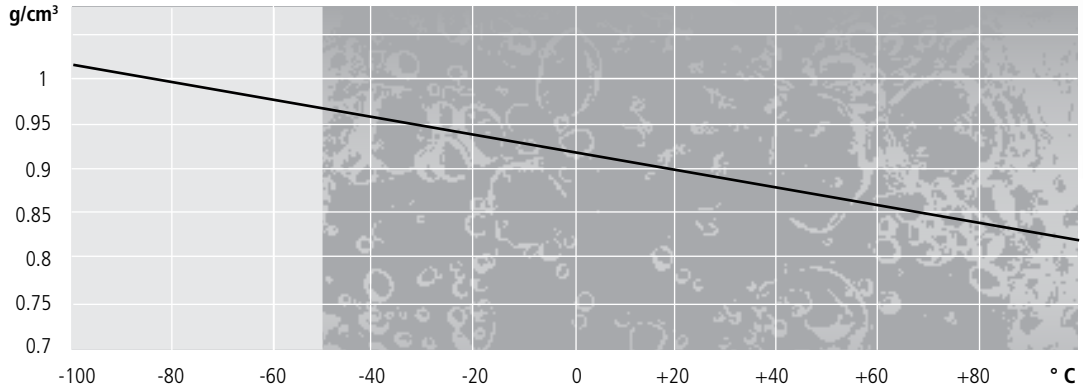


Note the tip on page 38 for the expansion of bath fluids in your application

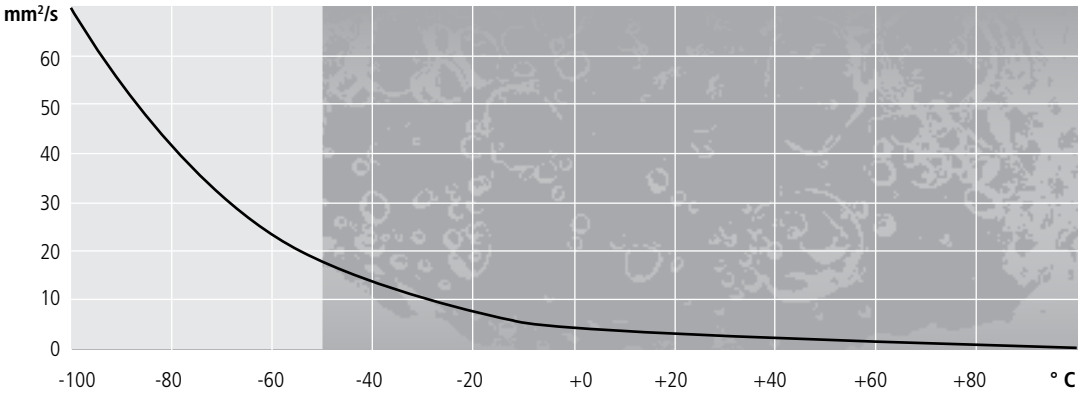
-100 °C 0 °C +100 °C

Physical properties of Thermal HY

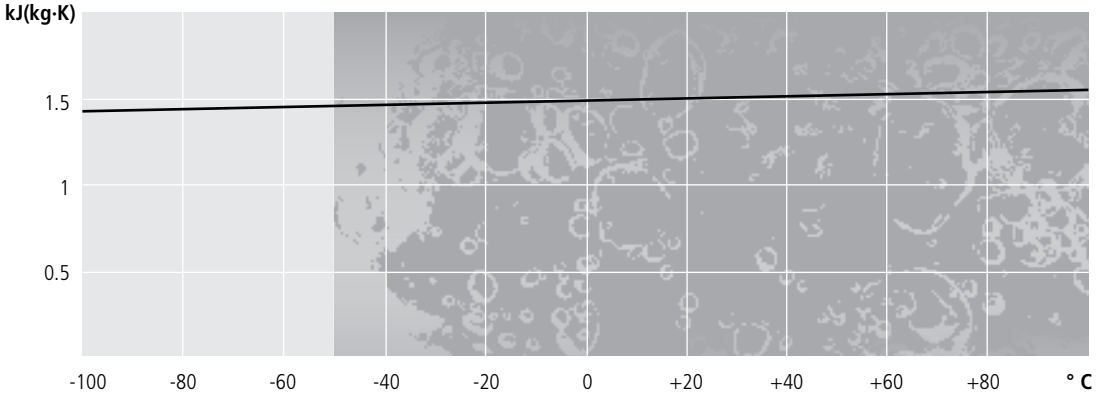
Density

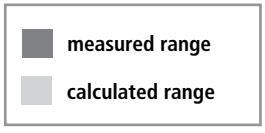


Viscosity



Specific heat capacity





+200 °C +300 °C +400 °C

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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 or request it from JULABO.

Property	Value
Working temperature °C	-50 … +105
Flash point °C	+124
Fire point °C	+142
Viscosity (kinematic at 20 °C) mm^2/s	5.66
Density (at 20 °C) g/cm^3	0.92
Pour point °C	-100
Boiling point °C	+288
Ignition temperature °C	+350
Color	clear
Thermal expansion coefficient K^{-1}	0.00094
Heat conductivity [W/(m·K)]	0.116
Specific volume resistivity [Ohm*cm]	$4 \cdot 10^{14}$

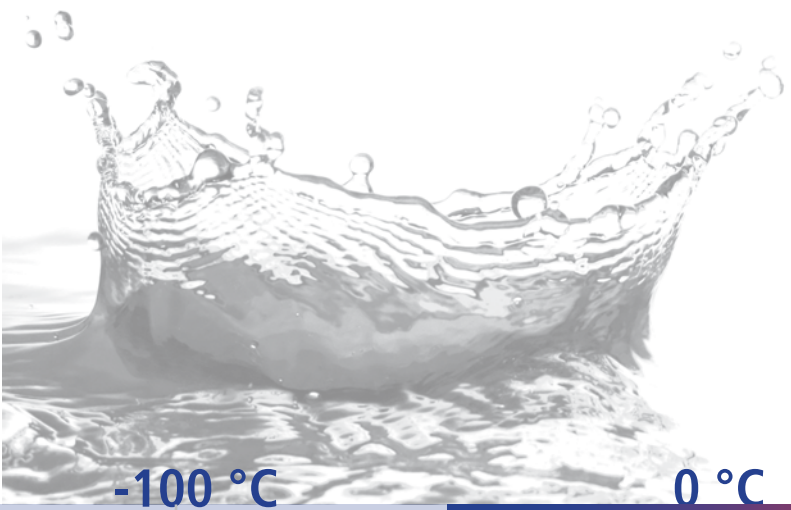
Advantages:

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

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

Suitable for the following units:

- JULABO Refrigerated Circulators
- JULABO Heating Circulators

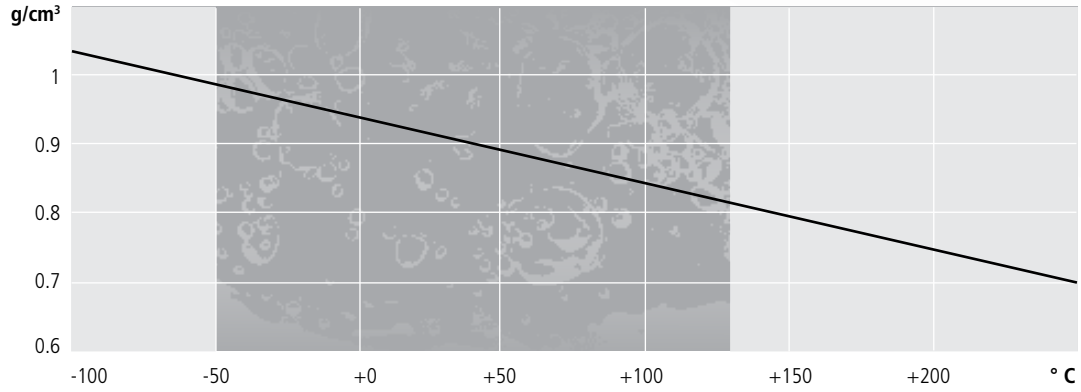


-100 °C 0 °C +100 °C

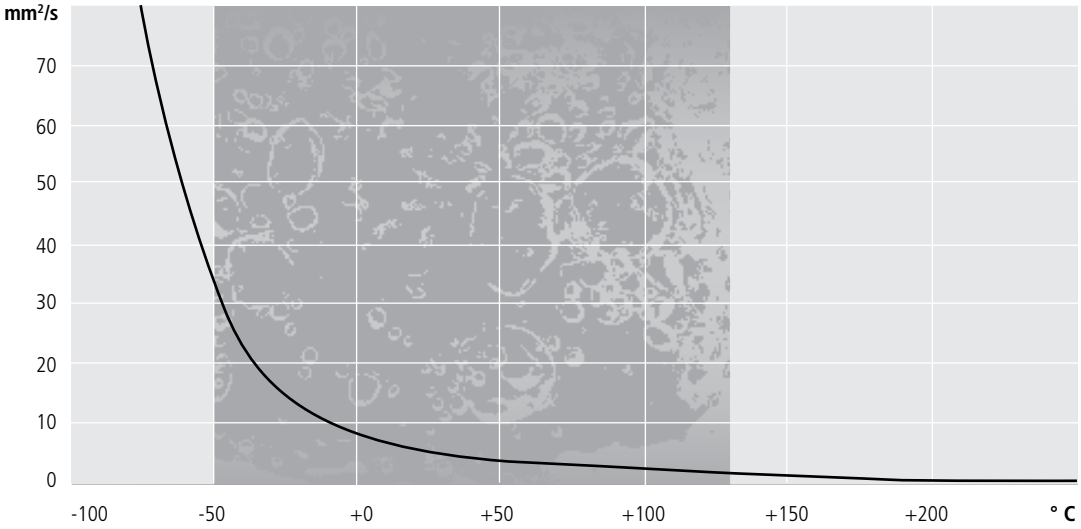
Note the tip on page 38 for the expansion of bath fluids in your application

Physical properties of Thermal H5

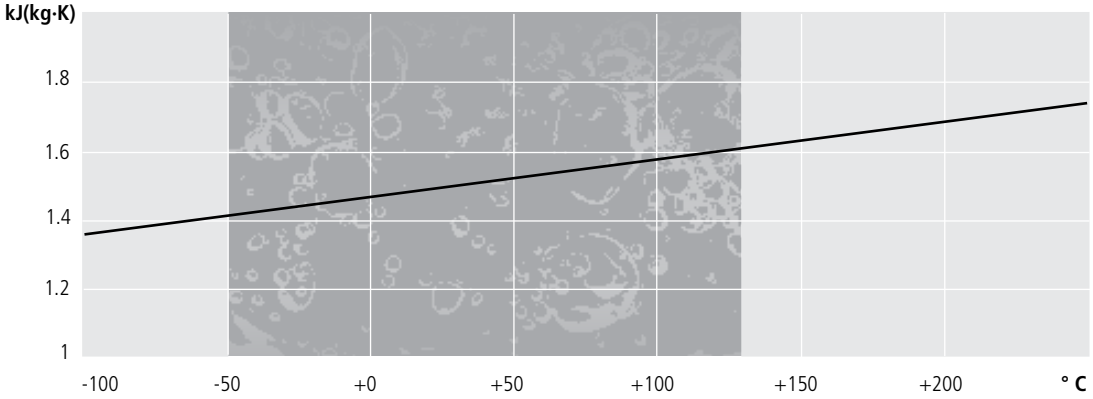
Density

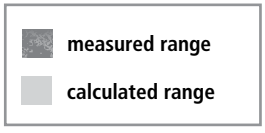


Viscosity



Specific heating capacity





+200 °C +300 °C +400 °C

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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 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^2/s	10.8
Density (at 20 °C) g/cm^3	0.94
Pour point °C	<-60
Boiling point °C	+288
Ignition temperature °C	+370
Color	clear
Thermal expansion coefficient K^{-1}	0.00092
Heat conductivity [W/(m·K)]	0.14
Specific volume resistivity [Ohm*cm]	$8 \cdot 10^{14}$

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

Suitable for the following units::

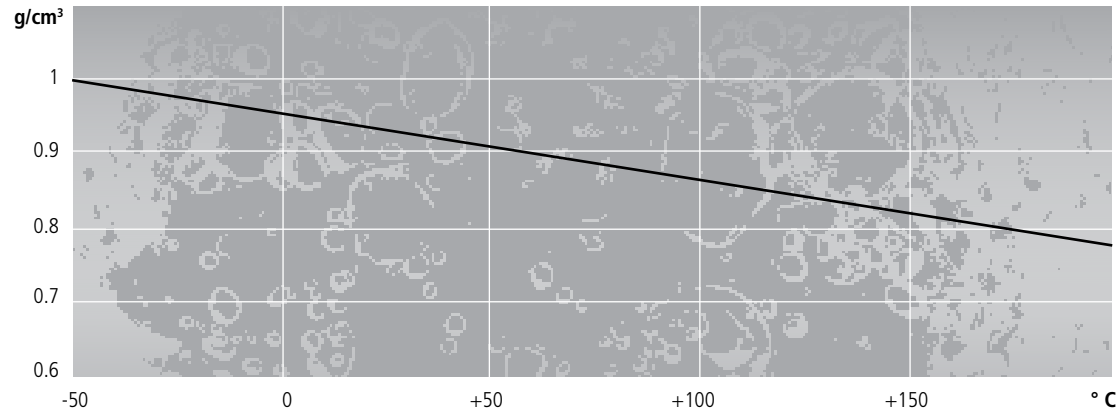
- JULABO Refrigerated Circulators
- JULABO Heating Circulators
- JULABO Chillers / Recirculating Coolers

Note the tip on page 38 for the expansion of bath fluids in your application

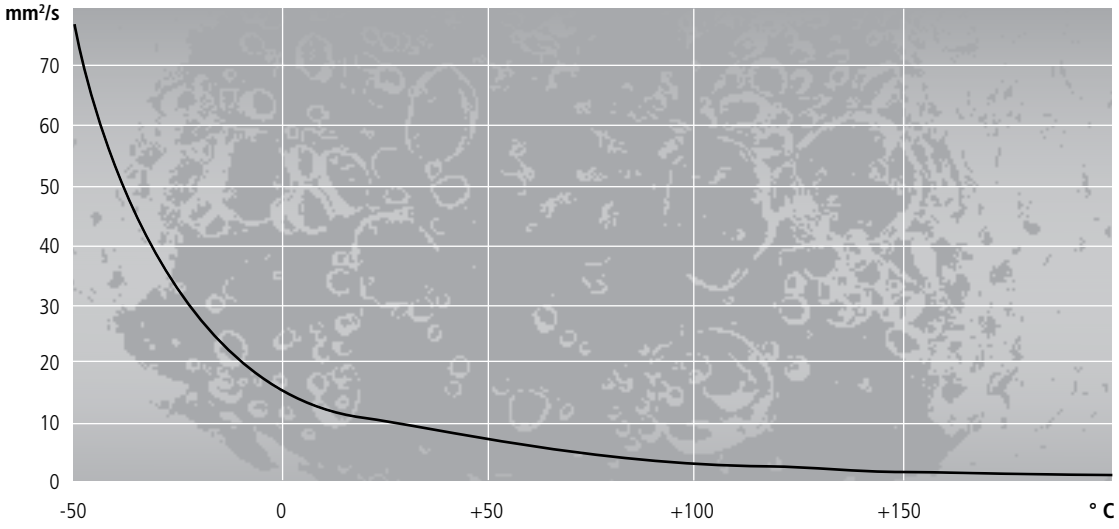
-100 °C 0 °C +100 °C

Physical properties of Thermal H10

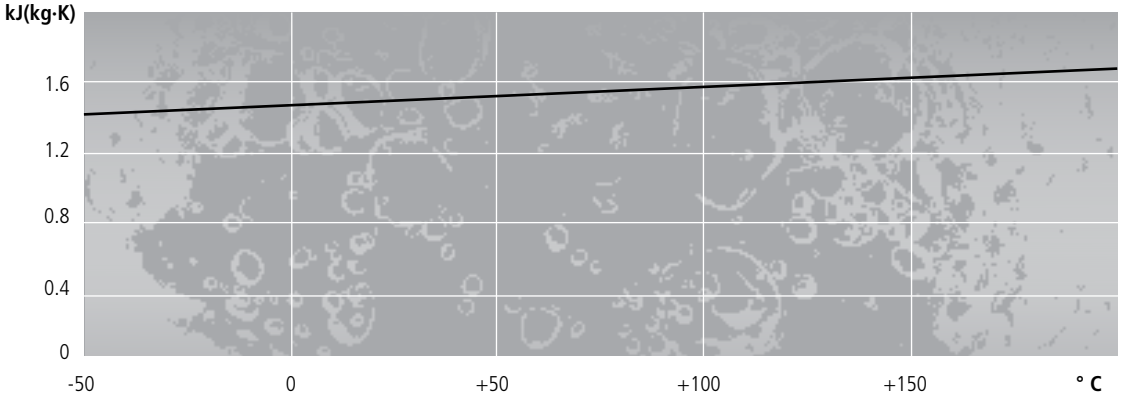
Density



Viscosity



Specific heat capacity



measured range

+200 °C +300 °C +400 °C

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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 or request it from JULABO.

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

Advantages:

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

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

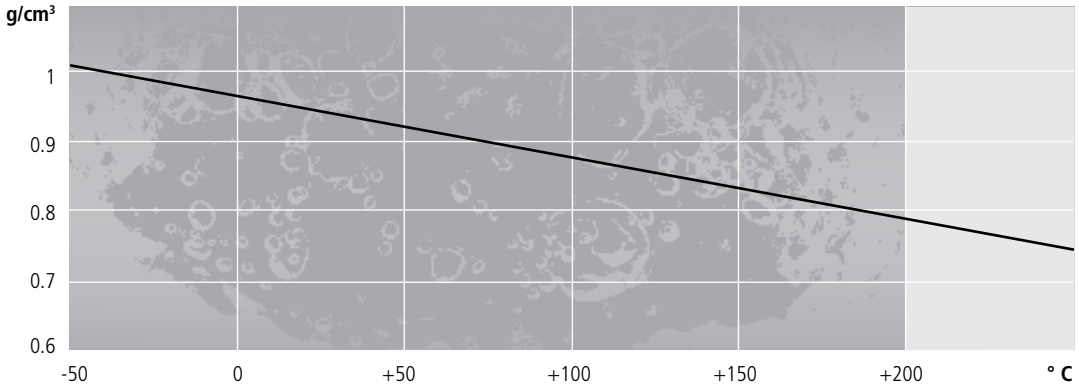
Suitable for the following units:
- JULABO Refrigerated Circulators
- JULABO Heating Circulators

Note the tip on page 38 for the expansion of bath fluids in your application

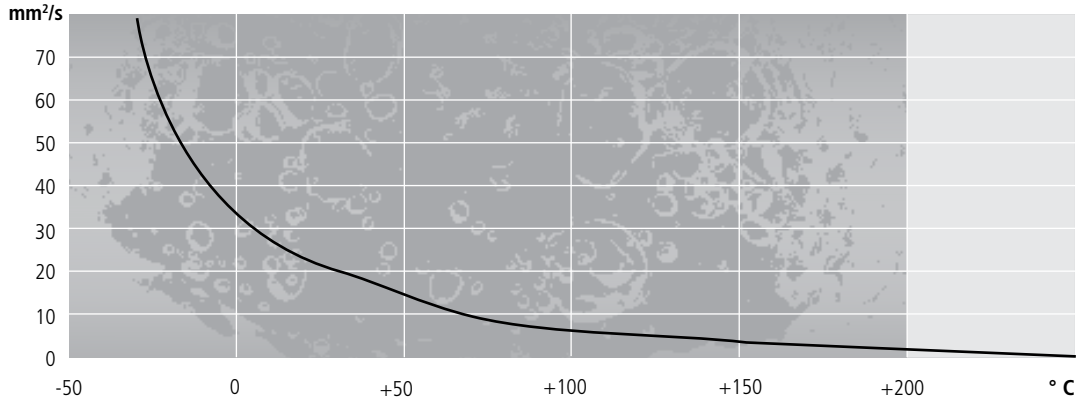
-100 °C 0 °C +100 °C

Physical properties of Thermal H20S

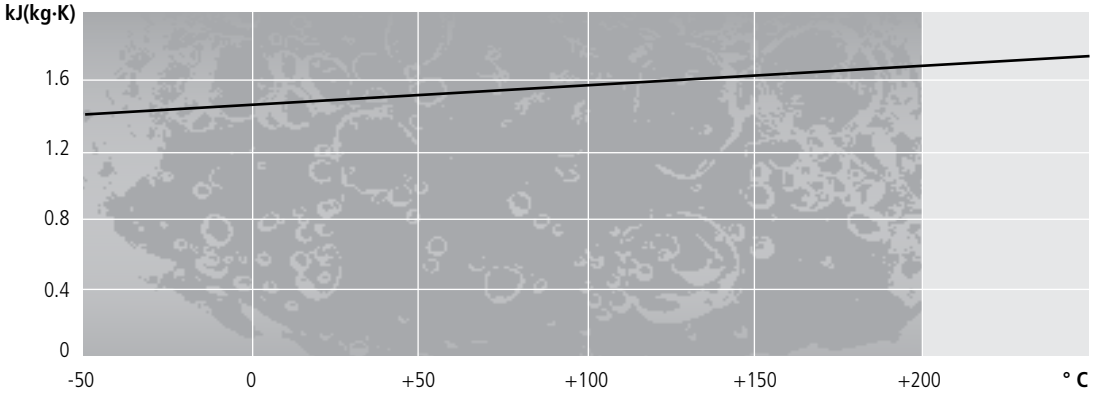
Density



Viscosity



Specific heating capacity



measured range

calculated range

+200 °C +300 °C +400 °C

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Bath fluid Thermal H200

JULABO Thermal H200 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 or request it from JULABO.

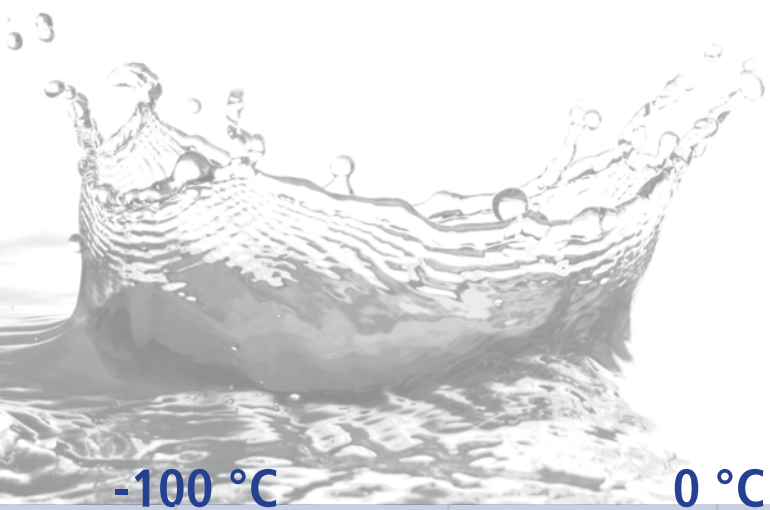
Advantages:

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

Property	Value
Working temperature °C	+60 … +200
Flash point °C	+292
Fire point °C	+334
Viscosity (kinematic at 20 °C) mm^2/s	115
Density (at 20 °C) g/cm^3	1.06
Pour point °C	-50
Boiling point °C	+315
Ignition temperature °C	>+400
Color	clear
Thermal expansion coefficient K^{-1}	0.00077
Heat conductivity [W/(m·K)]	0.14
Specific volume resistivity [Ohm*cm]	$4.2 \cdot 10^{15}$

Order number	
8 940 135	5 liters

Suitable for the following units:
- JULABO Heating Circulators

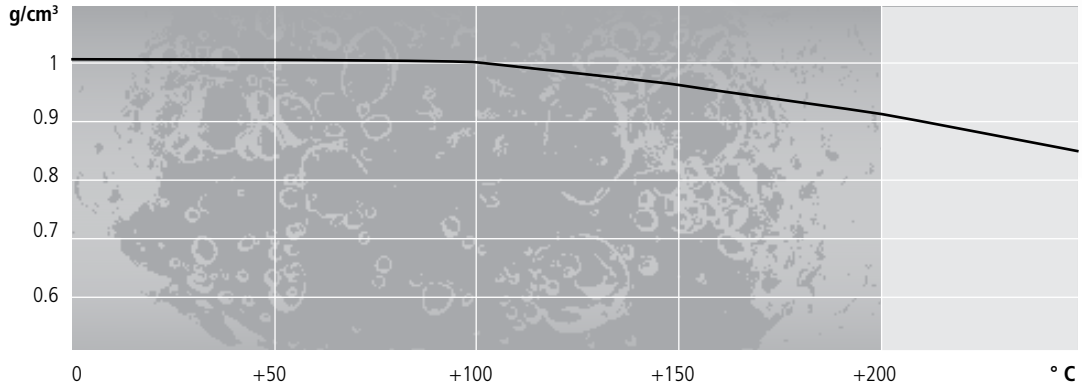


-100 °C 0 °C +100 °C

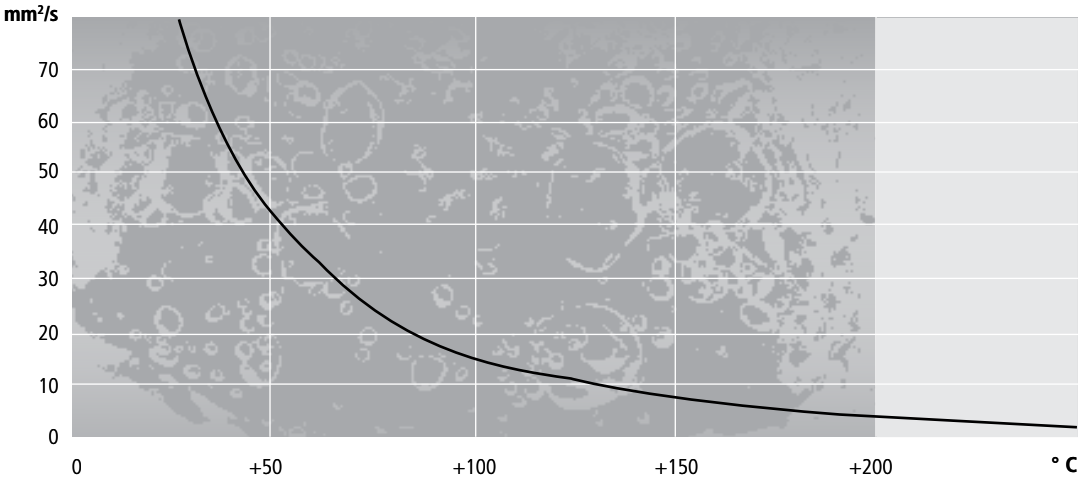
Note the tip on page 38 for the expansion of bath fluids in your application

Physical properties of Thermal H200

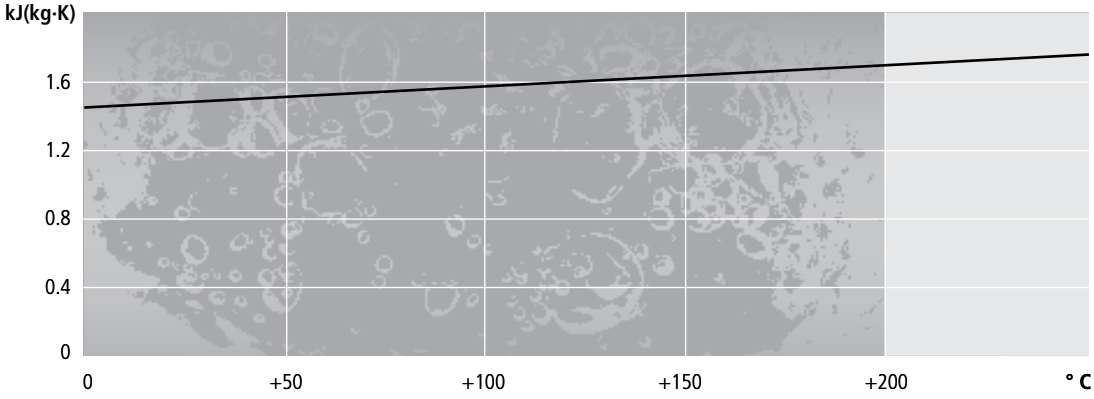
Density

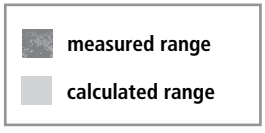


Viscosity



Specific heat capacity





+200 °C +300 °C +400 °C

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THE TEMPERATURE CONTROL COMPANY

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 or request it from JULABO.

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

Advantages:

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

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

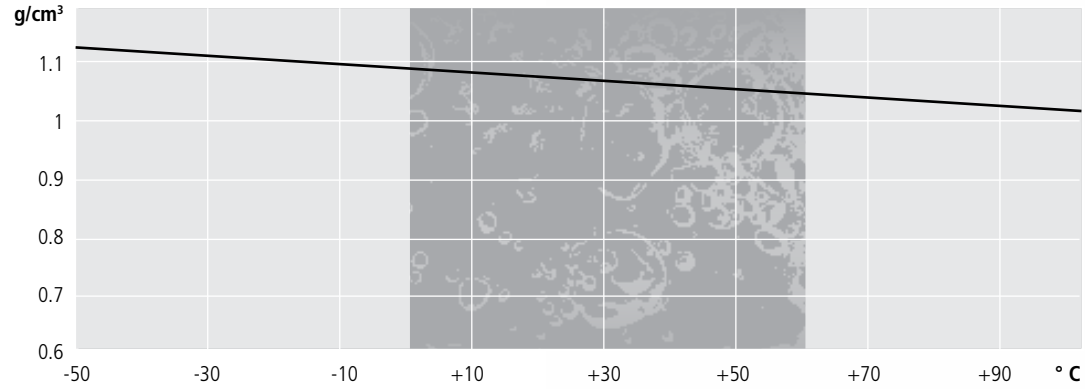
Suitable for following units:
- PRESTO® A30
- PRESTO® A40
- PRESTO® W40
- PRESTO® A45
- PRESTO® A45t

Note the tip on page 38 for the expansion of bath fluids in your application

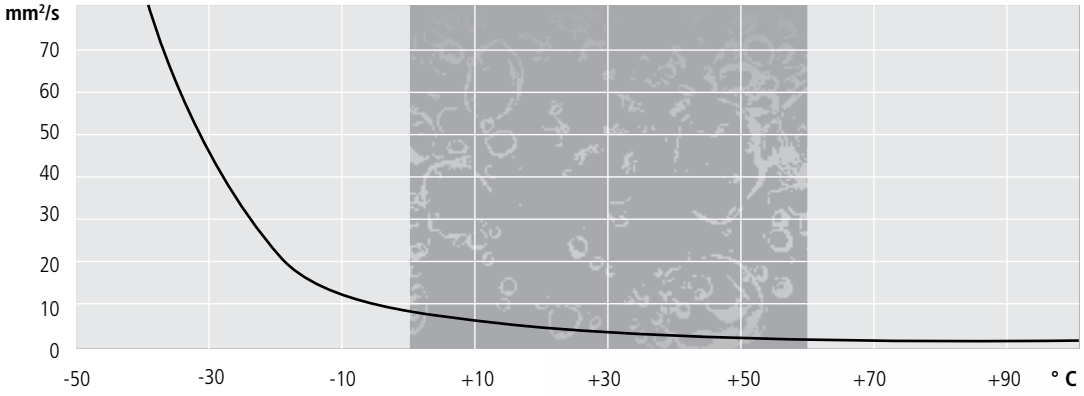
-100 °C 0 °C +100 °C

Physical properties of Thermal HL30

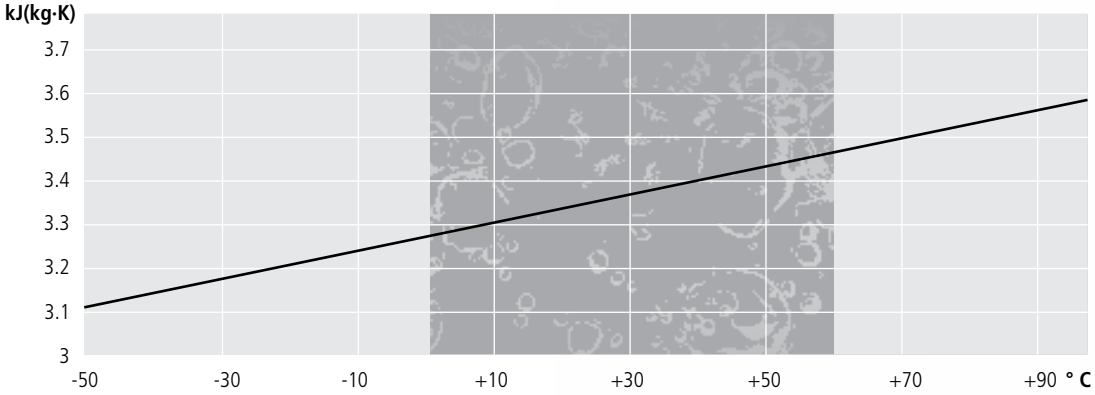
Density



Viscosity



Specific heat capacity



measured range

calculated range

+200 °C

+300 °C

+400 °C

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Bath fluid Thermal HL40

JULABO Thermal HL40 is a bath fluid based on silicone with a wide working temperature range from -40 °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 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	-40 … +250
Flash point °C	+124
Fire point °C	+142
Viscosity (kinematic at 20 °C) mm^2/s	5.66
Density (at 20 °C) g/cm^3	0.92
Pour point °C	-100
Boiling point °C	+288
Ignition temperature °C	+350
Color	clear
Thermal expansion coefficient K^{-1}	0.00094
Heat conductivity [W/(m·K)]	0.116
Specific volume resistivity [Ohm*cm]	$4 \cdot 10^{14}$

Order number	
8 940 137	5 liters
8 940 136	10 liters

Suitable for following units:

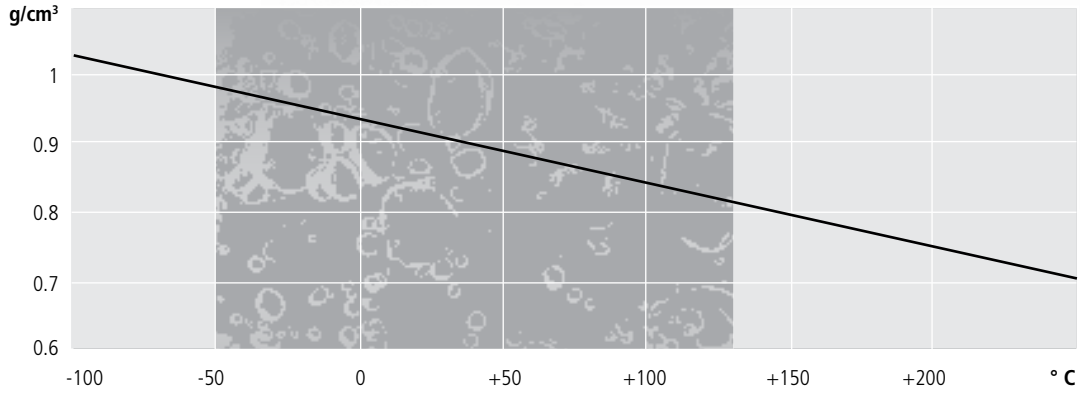
- Presto® PLUS
- Magnum 91

Note the tip on page 38 for the expansion of bath fluids in your application

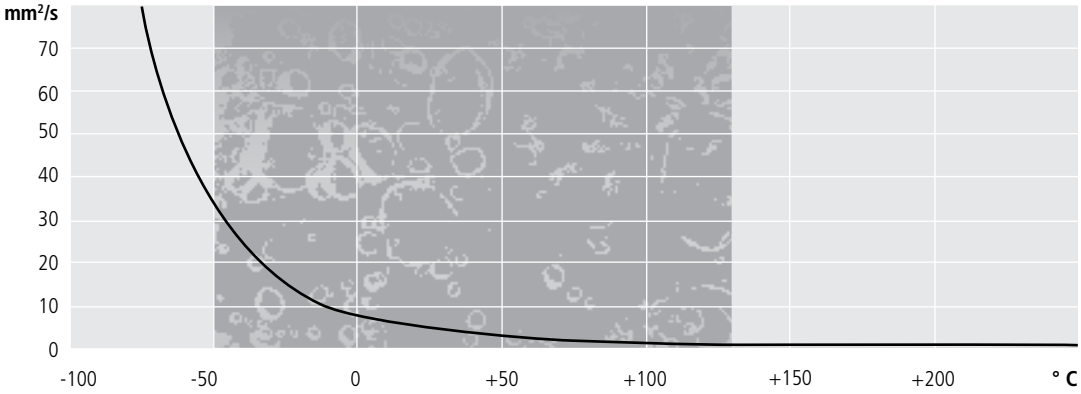
-100 °C 0 °C +100 °C

Physical properties of Thermal HL40

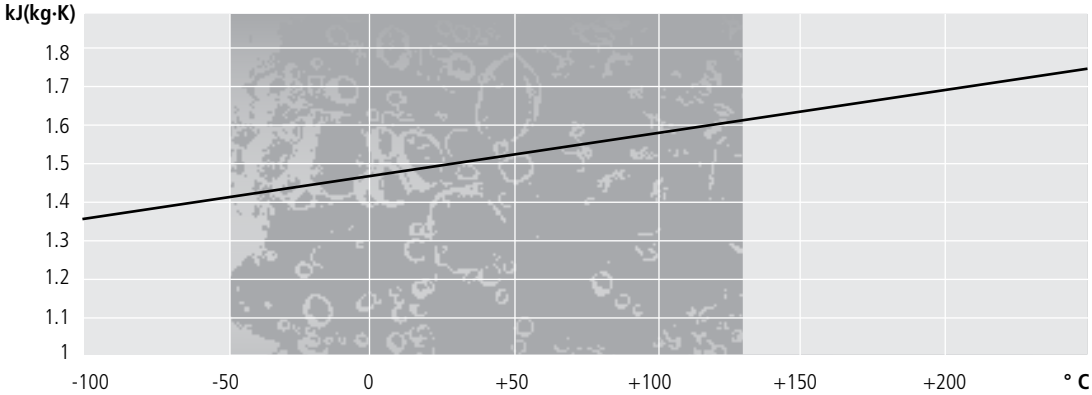
Density

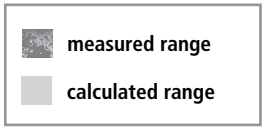


Viscosity



Specific heat capacity





+200 °C +300 °C +400 °C

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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 or request it from JULABO.

Property	Value
Working temperature °C	-60 … +250
Flash point °C	+124
Fire point °C	+142
Viscosity (kinematic at 20 °C) mm^2/s	5.66
Density (at 20 °C) g/cm^3	0.92
Pour point °C	-100
Boiling point °C	+288
Ignition temperature °C	+350
Color	clear
Thermal expansion coefficient K^{-1}	0.00094
Heat conductivity [W/(m·K)]	0.116
Specific volume resistivity [Ohm*cm]	$4 \cdot 10^{14}$

Advantages:

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

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

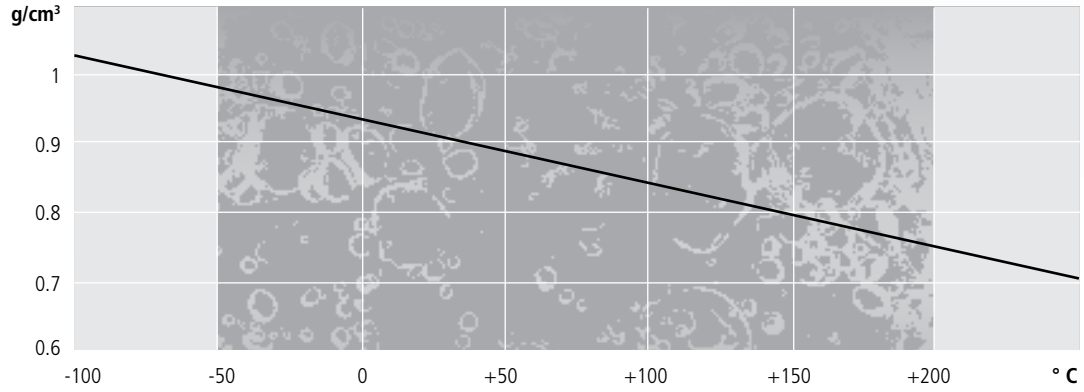
Suitable for the following units:
- PRESTO®

Note the tip on page 38 for the expansion of bath fluids in your application

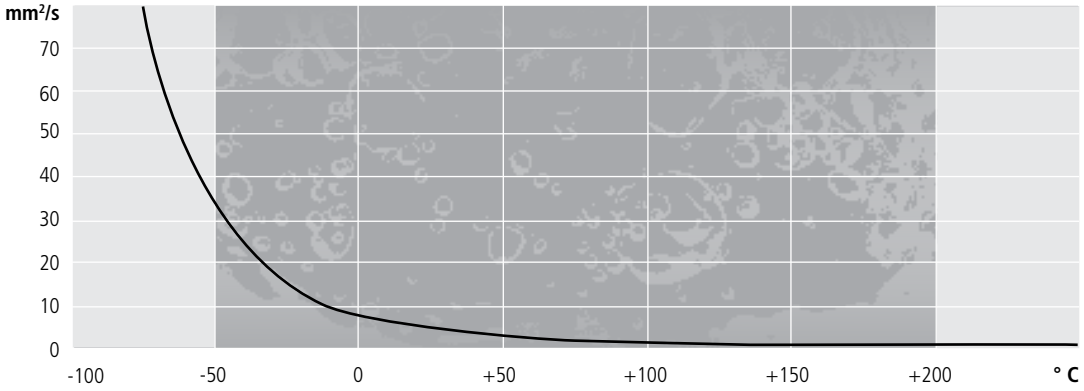
-100 °C 0 °C +100 °C

Physical properties of Thermal HL60

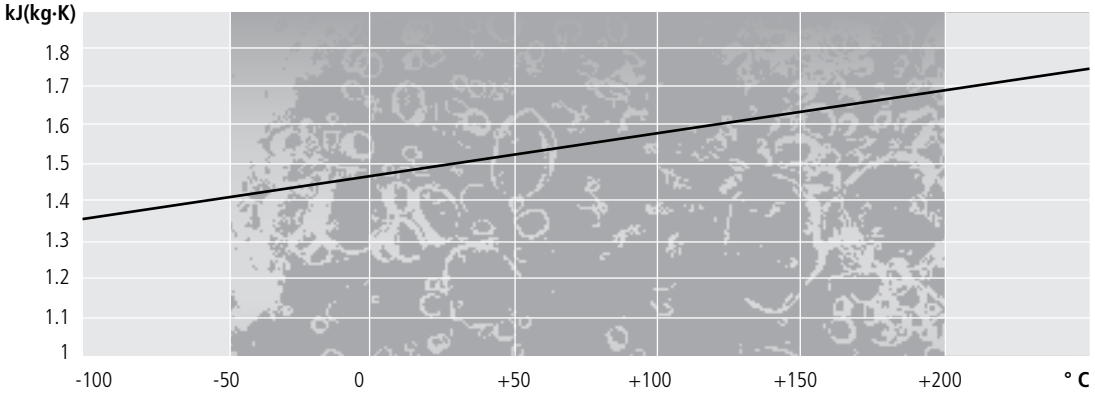
Density

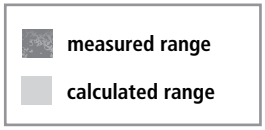


Viscosity



Specific heat capacity





+200 °C +300 °C +400 °C

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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 or request it from JULABO.

Advantages:

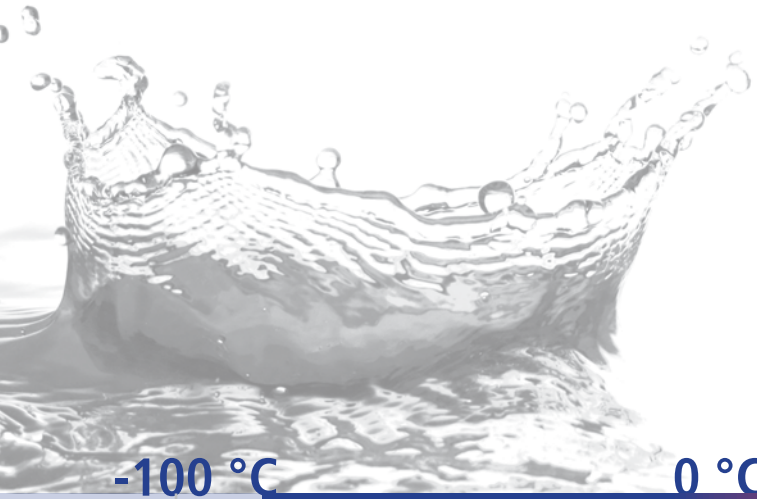
- **Low toxicity**
- **Low viscosity**
- **High stability**
- **Minimum odor**
- **Good heat conductivity**
- **Low corrosion tendency**
- **Wide temperature range**

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

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

Suitable for following units:

- PRESTO®
- Presto® PLUS
- Magnum 91

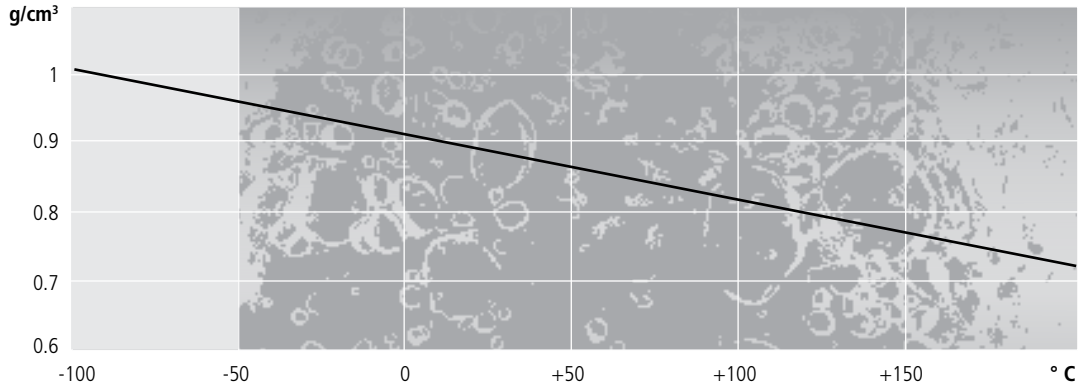


-100 °C 0 °C +100 °C

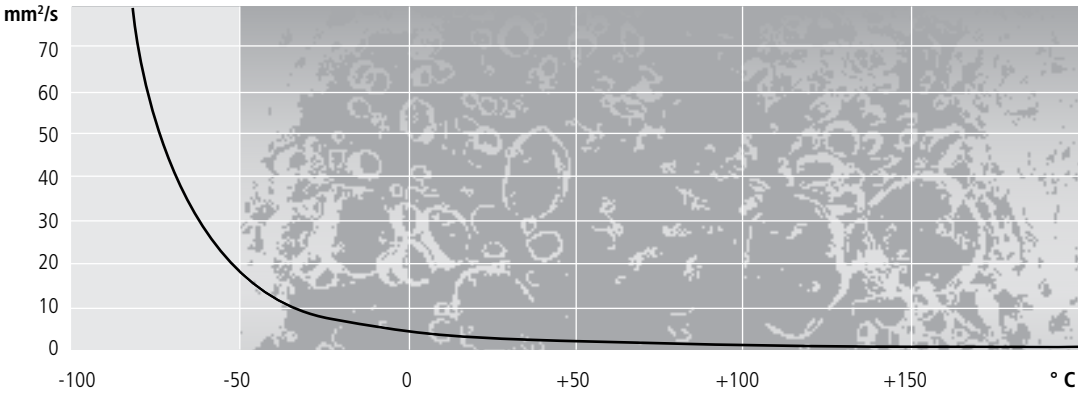
Note the tip on page 38 for the expansion of bath fluids in your application

Physical properties of Thermal HL80

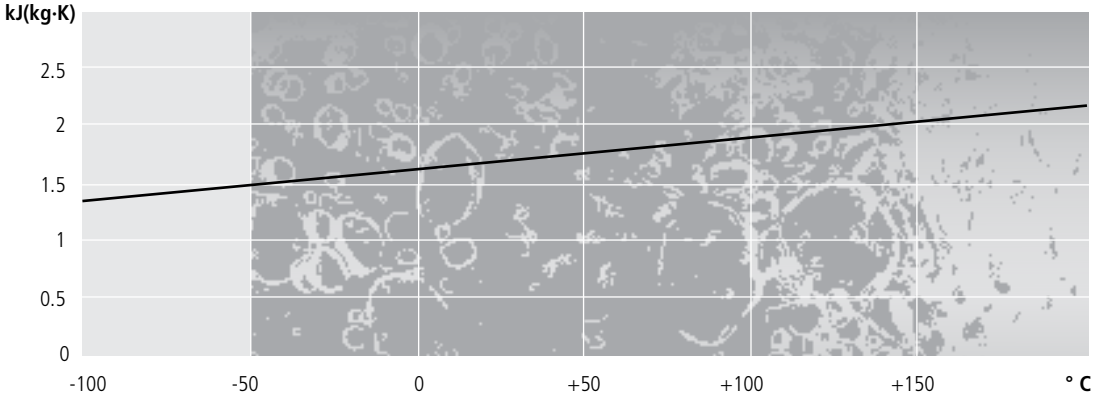
Density



Viscosity



Specific heat capacity



measured range

calculated range

+200 °C

+300 °C

+400 °C

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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 or request it from JULABO.

Property	Value
Working temperature °C	+20 … +250
Flash point °C	+230
Fire point °C	+264
Viscosity (kinematic at 20 °C) mm^2/s	22.3
Density (at 20 °C) g/cm^3	0.95
Pour point °C	-70
Boiling point °C	+424
Ignition temperature °C	+385
Color	light brown
Thermal expansion coefficient K^{-1}	0.00091
Heat conductivity [W/(m·K)]	0.14
Specific volume resistivity [Ohm*cm]	$4 \cdot 10^{15}$

Advantages

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

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

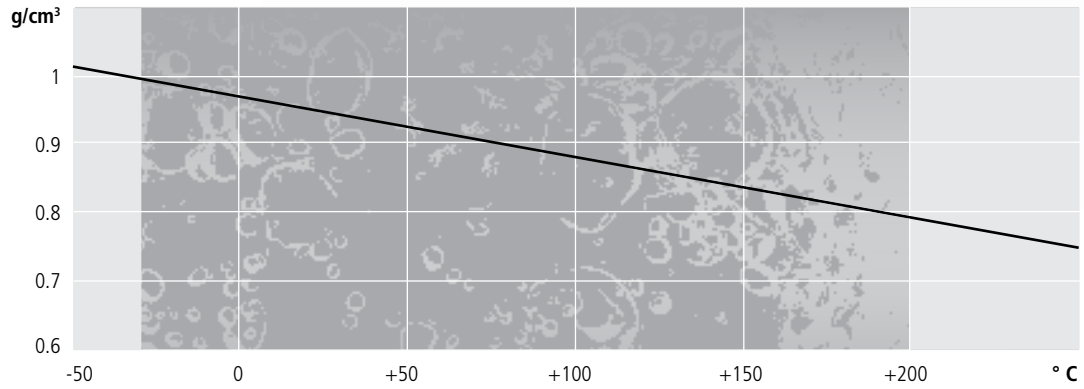
Suitable for following units:
- Forte HT

Note the tip on page 38 for the expansion of bath fluids in your application

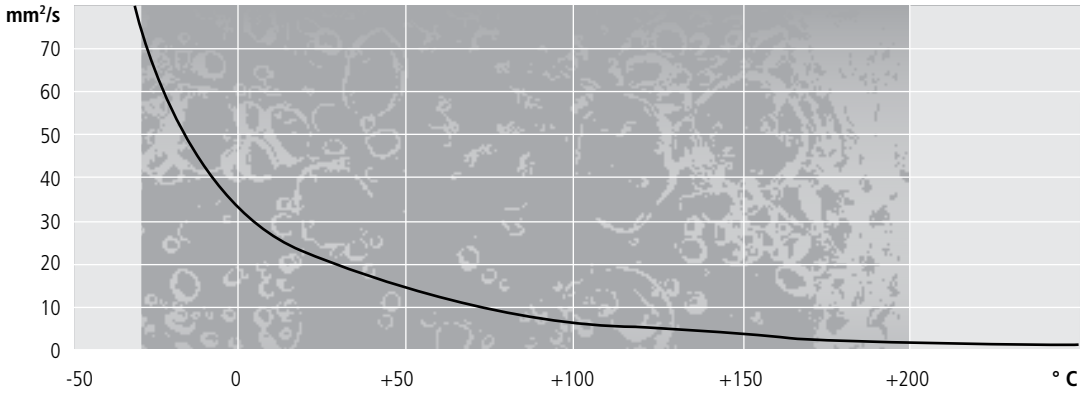
-100 °C 0 °C +100 °C

Physical properaties of Thermal H250S

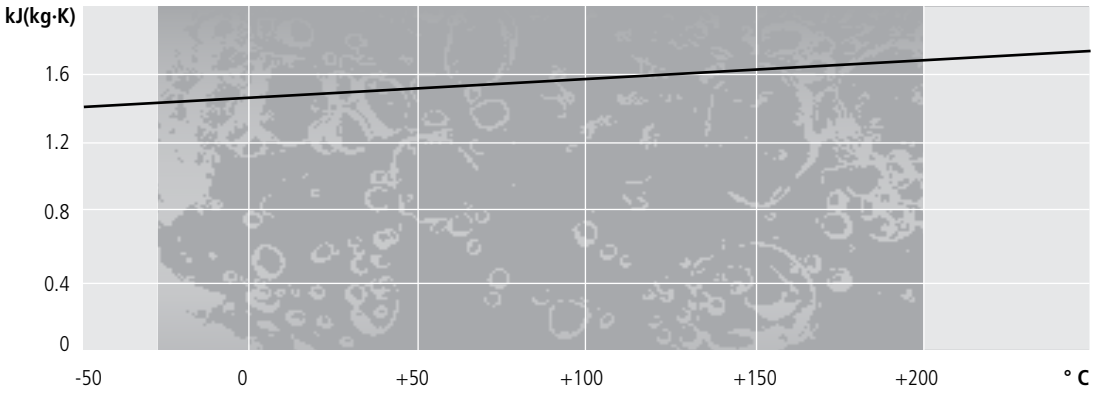
Density

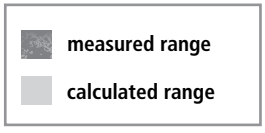


Viscosity



Specific heat capacity





+200 °C +300 °C +400 °C

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THE TEMPERATURE CONTROL COMPANY

Bath fluid Thermal H250

JULABO Thermal H250 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.

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 or request it from JULABO.

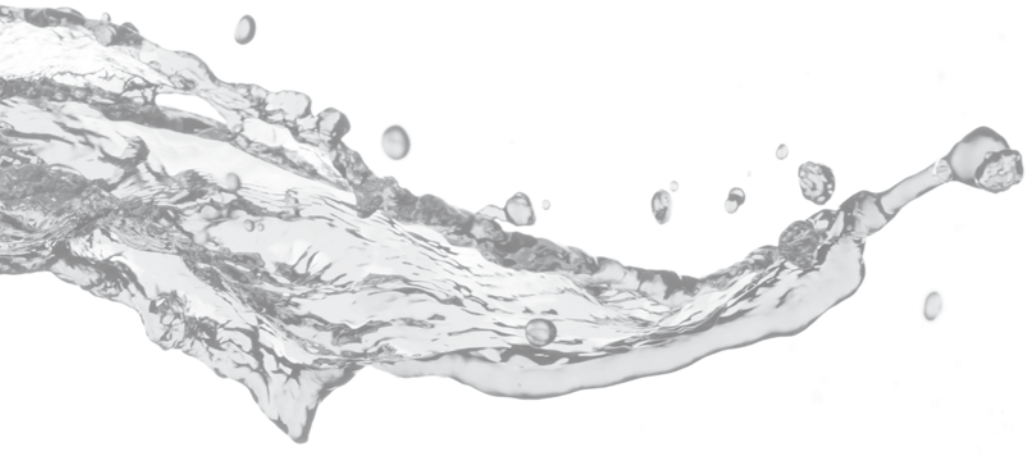
Advantages:

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

Property	Value
Working temperature °C	+80 … +250
Flash point °C	+292
Fire point °C	+334
Viscosity (kinematic at 20 °C) mm^2/s	115
Density (at 20 °C) g/cm^3	1.06
Pour point °C	-50
Boiling point °C	+315
Ignintion temperature °C	>+400
Color	clear
Thermal expansion coefficient K^{-1}	0.00077
Heat conductivity [W/(m·K)]	0.14
Specific volume resistivity [Ohm*cm]	$4.2 \cdot 10^{15}$

Order number	
8 940 117	5 liters

Suitable for following units:
- Forte HT

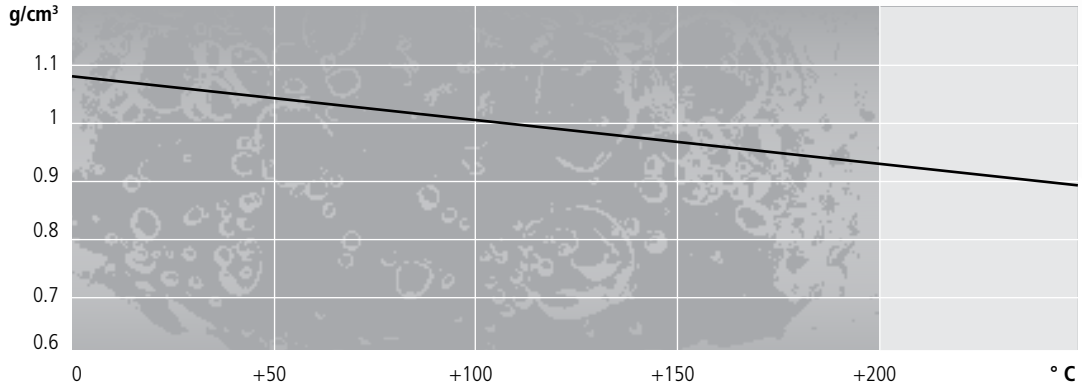


Note the tip on page 38 for the expansion of bath fluids in your application

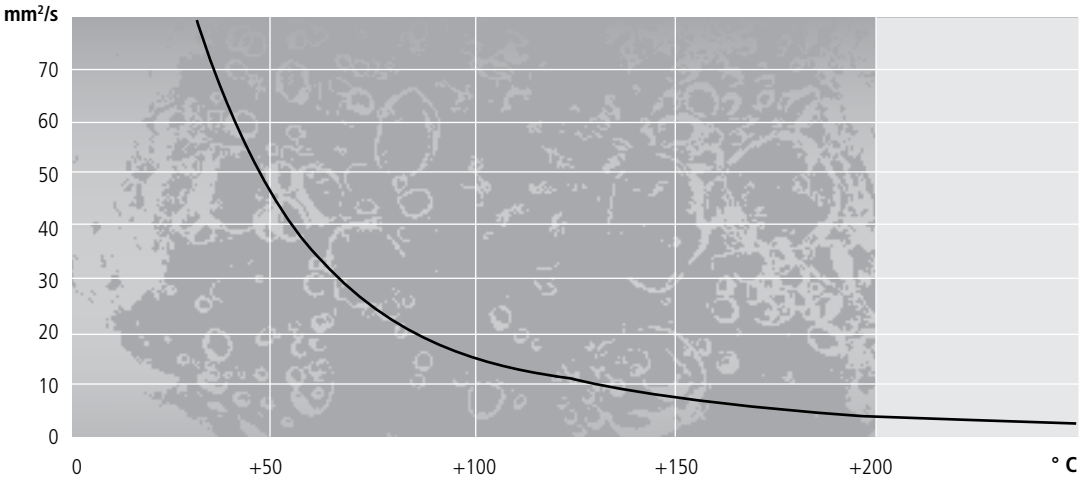
-100 °C 0 °C +100 °C

Physical properties of Thermal H250

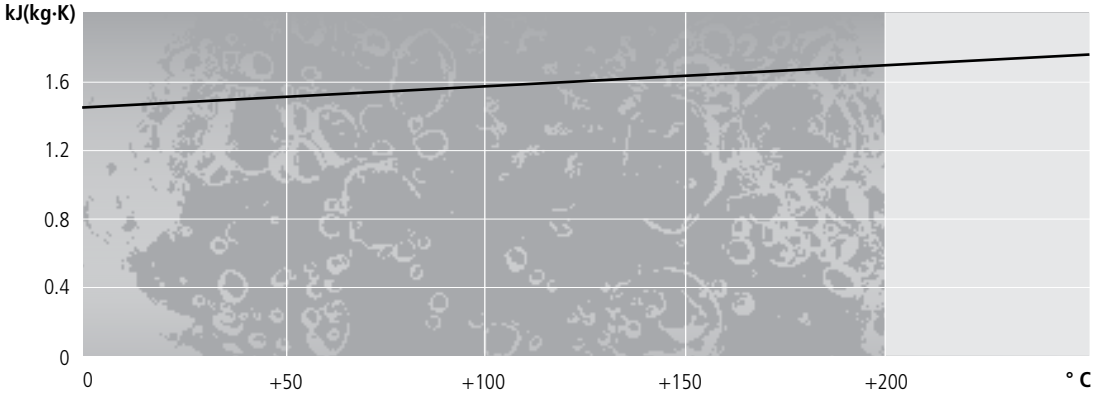
Density



Viscosity



Specific heat capacity



measured range

calculated range

+200 °C

+300 °C

+400 °C

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THE TEMPERATURE CONTROL COMPANY

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 or request it from JULABO.

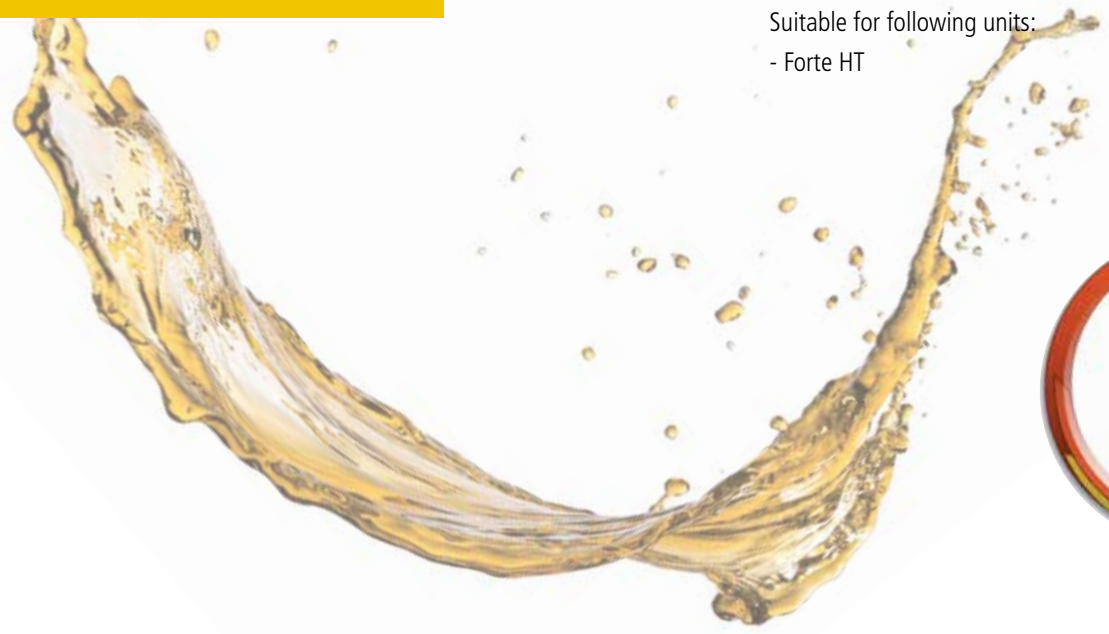
Advantages:

- **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^2/s	131
Density (at 20 °C) g/cm^3	1.01
Pour point °C	-32
Boiling point °C	+340
Ignition temperature °C	+373
Color	light yellow
Thermal expansion coefficient K^{-1}	0.00068
Heat conductivity [W/(m·K)]	0.116
Specific volume resistivity [Ohm*cm]	$4 \cdot 10^{14}$

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

Suitable for following units:
- Forte HT

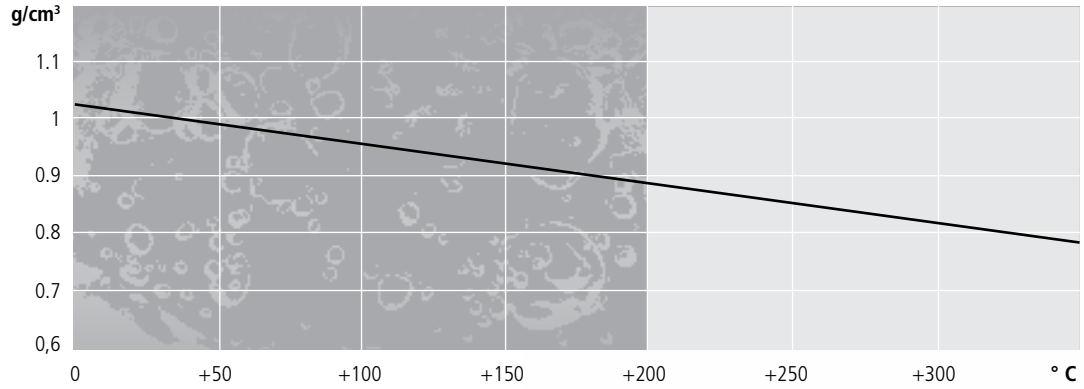


Note the tip on page 38 for the expansion of bath fluids in your application

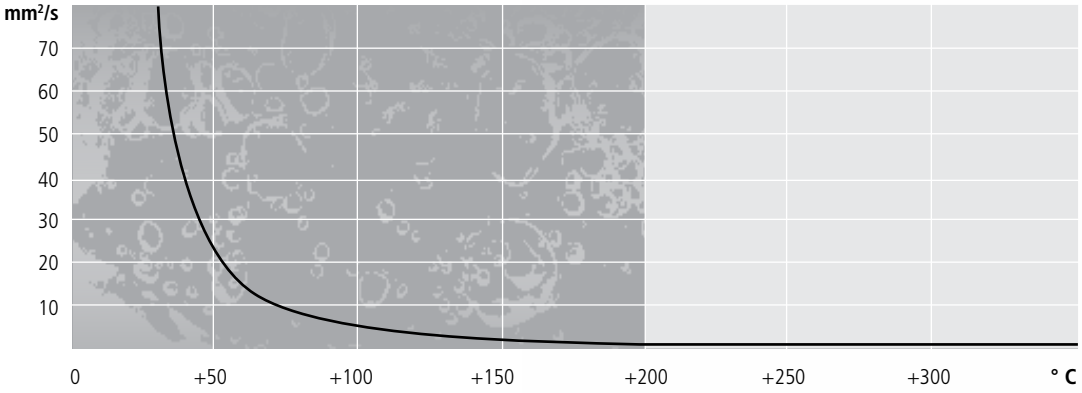
-100 °C 0 °C +100 °C

Physical properties of Thermal H335

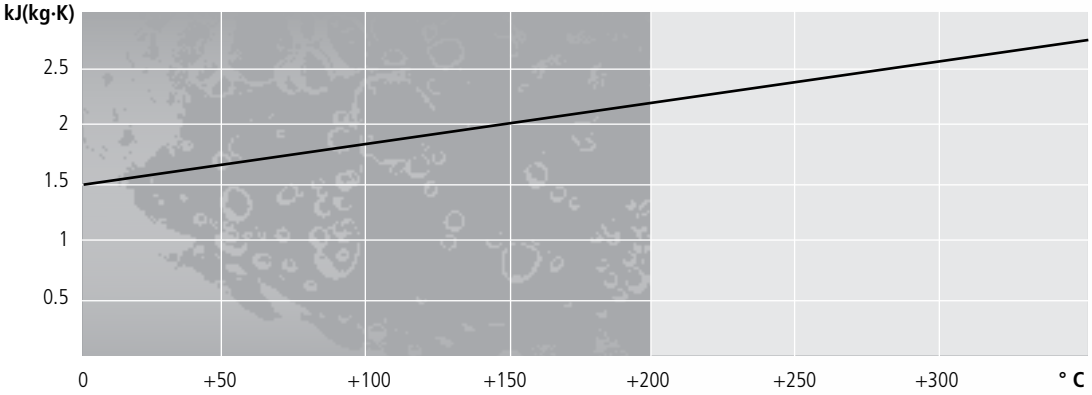
Density



Viscosity



Specific heat capacity



measured range

calculated range

+200 °C

+300 °C

+400 °C

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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 or request it from JULABO.

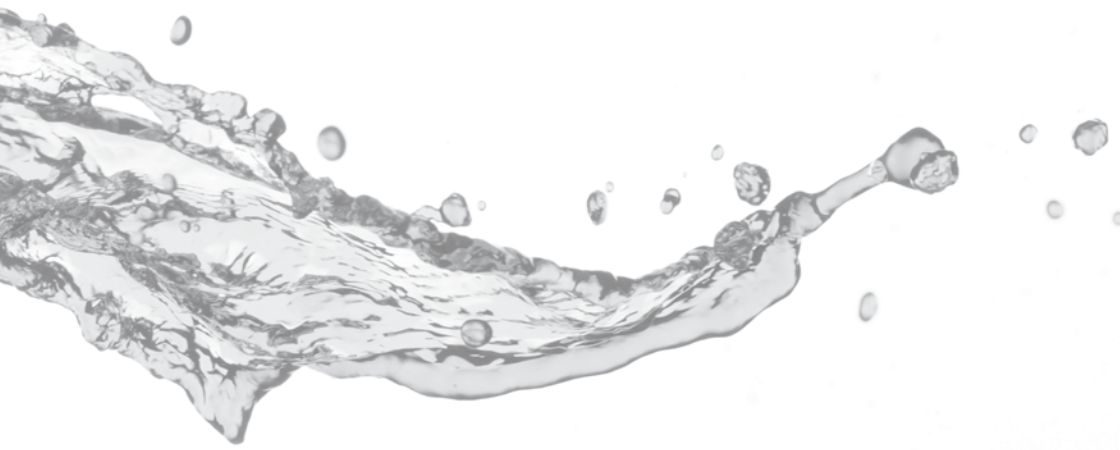
Advantages:

- **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^2/s	48.3
Density (at 20 °C) g/cm^3	1.04
Pour point °C	-34
Boiling point °C	+371
Ignition temperature °C	+450
Color	clear
Thermal expansion coefficient K^{-1}	0.0008
Heat conductivity [W/(m·K)]	0.131
Specific volume resistivity [Ohm*cm]	$1.6 \cdot 10^{15}$

Order number	
8 940 111	5 liters

Suitable for following units:
- Forte HT

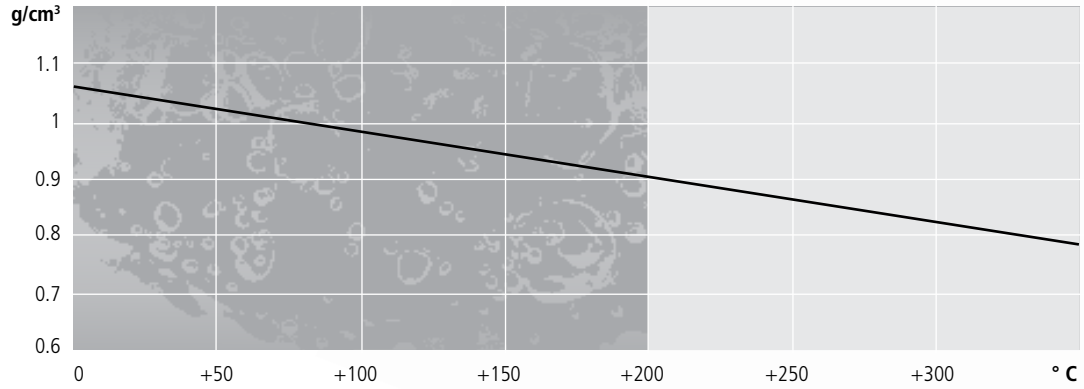


Note the tip on page 38 for the expansion of bath fluids in your application

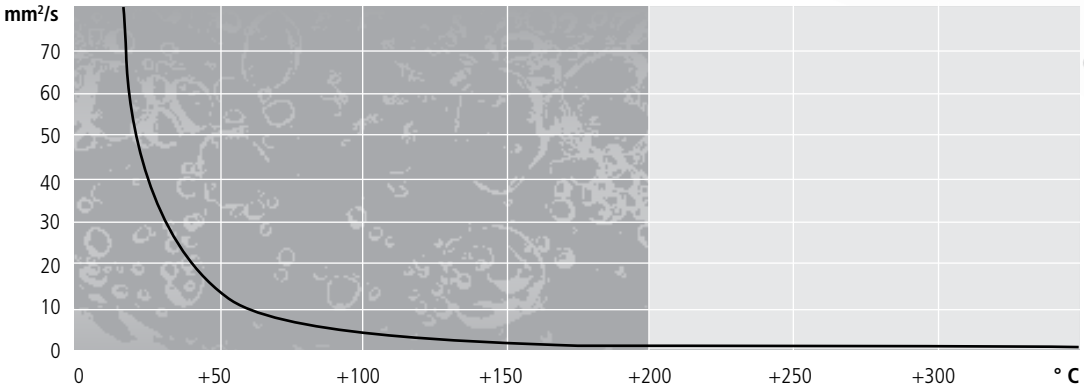
-100 °C 0 °C +100 °C

Physical properties of Thermal H350

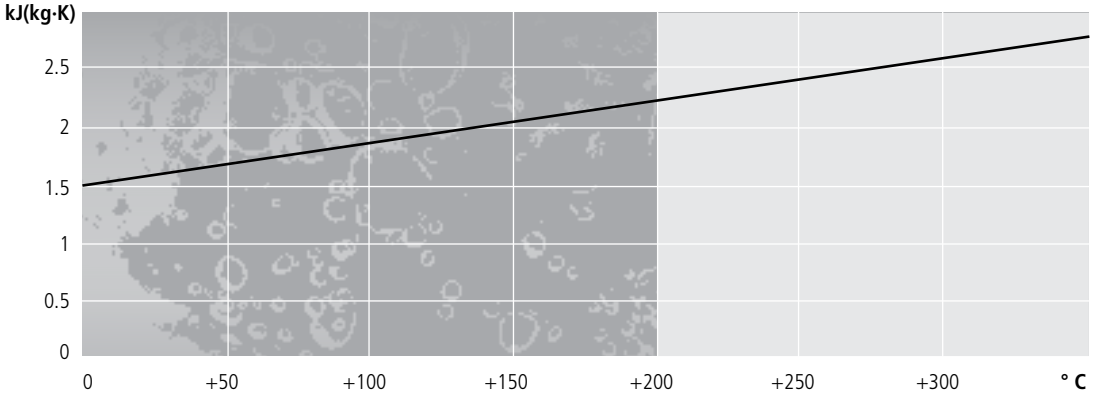
Density



Viscosity



Specific heat capacity



measured range

calculated range

+200 °C

+300 °C

+400 °C

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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 month 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 or request it from JULABO.

Advantages:

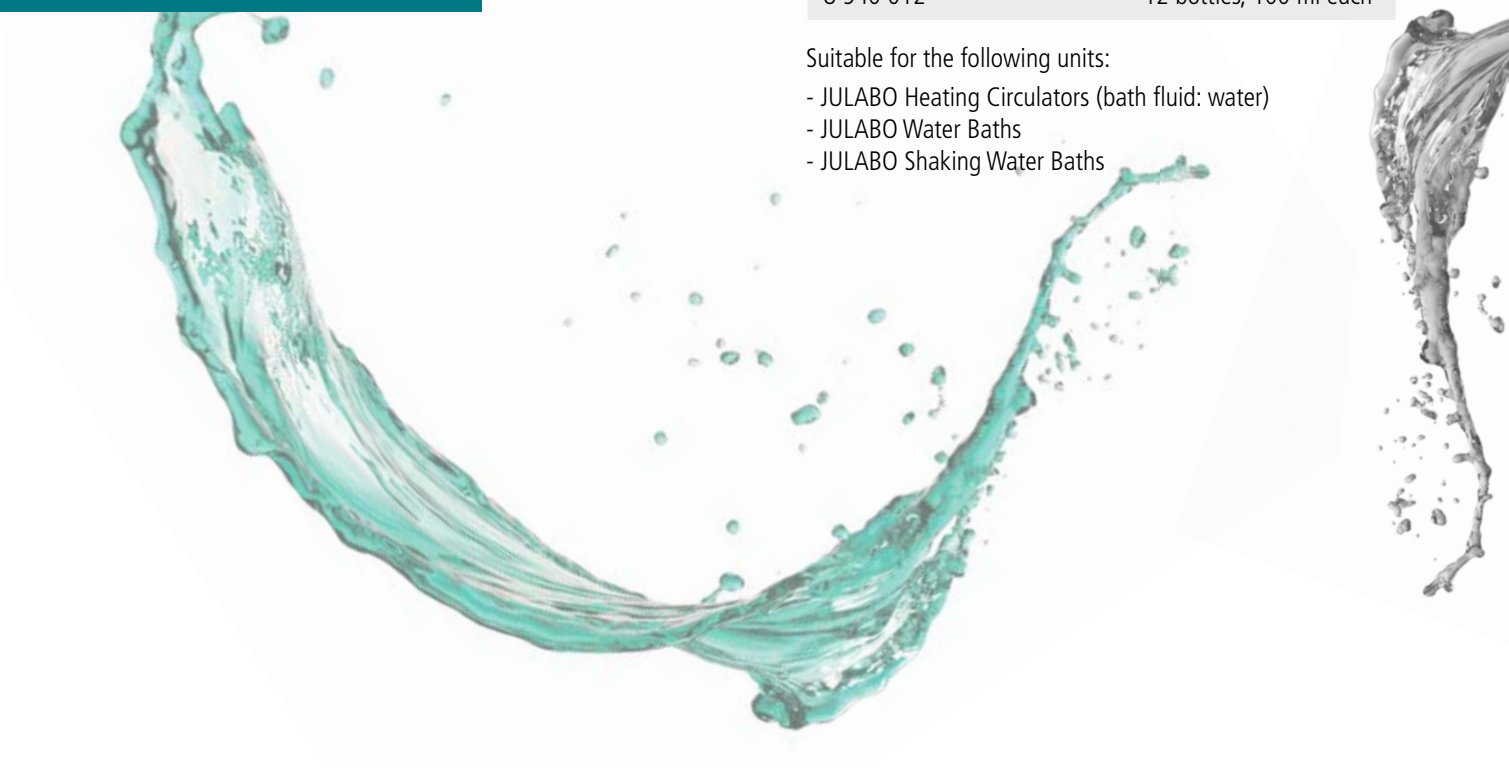
- **excellent heat conductivity**
- **minimum odor**
- **low corrosion tendency**
- **low toxicity**

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

T E R M I N O L O G Y

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**

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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:

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

ΔV = change of volume
β = Thermal expansion coefficient
ΔT = Working temperature difference (Difference from t_1 final temperature - t_0 starting temperature)
V_0 = Filling volume
D_{mittel} = medium density (readable at $t_{average}$)

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
ΔT = 90 K
β = as shown in the table
$D_{average}$ = as shown in the graphic

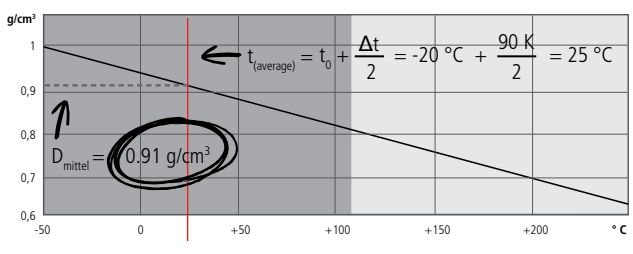
$\Delta t = - t_1 - t_0 = +70\ °C - (-20\ °C) = 90\ K$

Change of volume:

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

The volume will expand by almost 2 liters.

Density Thermal HL40



-100 °C 0 °C +100 °C

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