# Temperature and Density Measurement

For the measurement of temperature and density, BRAND offers high quality thermometers, individually calibrated BLAUBRAND® density bottles, and fast, reliable hydrometers.

**Consistent precision.**

BRAND



# Density Bottles

BLAUBRAND® density bottles are individually adjusted. The nominal capacity is indelibly engraved on each bottle. Each bottle is calibrated with its own stopper or thermometer; hence, stoppers and thermometers are not interchangeable.
Each bottle and its stopper or thermometer is marked with a unique matching identification number.

**Certification note:**

All BLAUBRAND® pycnometers are supplied with the following certification:

**in quantity**

- with an individual certificate

**upon request**

- with a DKD Calibration Certificate (from a DKD-accredited calibration laboratory at BRAND)

## Density bottles, uncalibrated

Borosilicate glass 3.3. DIN ISO 3507, Gay-Lussac type. Stopper NS 10/19 with capillary. Top of stopper ground and polished. Nominal capacity printed on the bottom. Pack of 2.

| Nominal capacity cm³ | Cat. No. |
|---|---|
| 5 | 432 05 |
| 10 | 432 08 |
| 25 | 432 20 |
| 50 | 432 28 |
| 100 | 432 38 |

## Density bottles, calibrated

**BLAUBRAND®**

Borosilicate glass 3.3. DIN ISO 3507, Gay-Lussac type. Calibrated to contain (TC, In). Individual certificate included. Stopper NS 10/19 with capillary. Top of stopper ground and polished. The volume in cm³ is specified to a precision of 3 decimal places. Pack of 1.

| Nominal capacity cm³ | Cat. No. |
|---|---|
| 5 | 433 05 |
| 10 | 433 08 |
| 25 | 433 20 |
| 50 | 433 28 |
| 100 | 433 38 |

## Density bottles, calibrated

**BLAUBRAND®.**
**With thermometer and side capillary**

Borosilicate glass 3.3. DIN ISO 3507. Calibrated to contain (TC, In). Individual certificate included. Side capillary with conical ground cap size NS 7/16. Thermometer with enclosed scale, with standard ground joint NS 10/19, range 10 to 35 °C, divided in 0.2 °C, mercury filled. The volume in $cm^3$ is specified to a precision of 3 decimal places. Pack of 1.

| Nominal capacity cm³ | Cat. No. |
|---|---|
| 10 | 434 08 |
| 25 | 434 20 |
| 50 | 434 28 |
| 100 | 434 38 |

BLAU BRAND

Inscriptions in high contrast blue enamel

## Oxygen flasks, Winkler pattern

Soda-lime glass. For the determination of oxygen dissolved in water. The measured volume is indicated to ± 0.01 ml. White labelling area. Solid, obliquely cut standard-ground glass stopper can be secured with a fastening clip.
Each flask is calibrated with its own stopper; hence, stoppers and flasks are not interchangeable. Each flask and its stopper is marked with a unique matching identification number. Pack of 2.

| Nominal capacity ml | Neck Size | Cat. No. |
|---|---|---|
| 100 - 150 | 14/23 | 3860 38 |
| 250 - 300 | 19/26 | 3860 48 |

## Accessories:

(please order separately)

### Fastening clips for oxygen flasks Winkler pattern

Pack of 1.

| For Flask | Cat. No. |
|---|---|
| 3860 38 | 3861 38 |
| 3860 48 | 3861 48 |



# ASTM Centrifuge Tubes

**BLAUBRAND® ASTM centrifuge tubes**

Borosilicate glass 3.3. Capacity 100 ml.
Withstands RCF up to 700.
Design, accuracy, etc. to meet ASTM ("American Society for Testing and Materials") specifications.
Pack of 2.

**Note:**

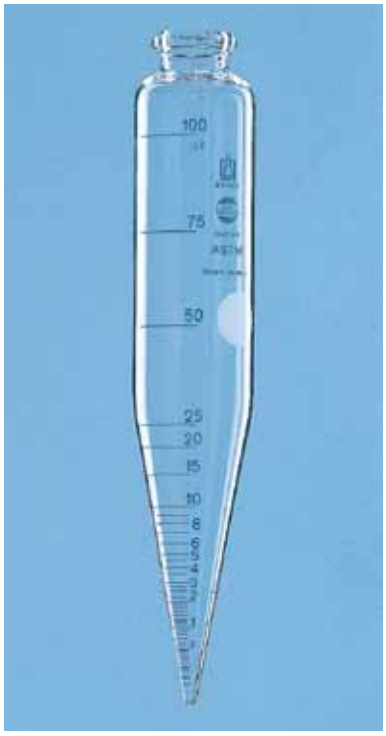
On request, ASTM centrifuge tubes are also available with individual quality certificate by BRAND.

**Relative Centrifugal Force (RCF)**

$$RCF = 1.118 \cdot r \cdot \left(\frac{n}{1000}\right)^2$$

(see DIN 58970)

r = Rotation radius in mm
n = Speed

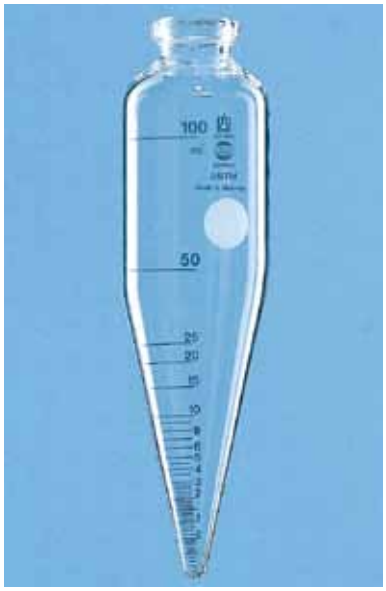


## ASTM centrifuge tubes, cylindrical, conical bottom

ASTM D 91.
Length max. 203 mm.

| Graduation ml | Subdiv. ml |
|---|---|
| from 0 to 0.5 | 0.05 |
| from 0.5 to 2 | 0.10 |
| from 2 to 3 | 0.20 |
| from 3 to 5 | 0.50 |
| from 5 to 10 | 1 |
| from 10 to 25 | 5 |
| from 25 to 100 | 25 |

| Cat. No. | 3620 38 |
|---|---|



## ASTM centrifuge tubes, cylindrical, conical bottom

Former standard ASTM D 96.
Length max. 167 mm.

| Graduation ml | Subdiv. ml |
|---|---|
| from 0 to 0.5 | 0.05 |
| from 0.5 to 2 | 0.10 |
| from 2 to 3 | 0.20 |
| from 3 to 5 | 0.50 |
| from 5 to 10 | 1 |
| from 10 to 25 | 5 |
| from 25 to 100 | 25 |

| Cat. No. | 3623 38 |
|---|---|



## ASTM centrifuge tubes, pear-shaped, cylindrical bottom

Former standard ASTM D 96.
Length max. 160 mm.

| Graduation ml | Subdiv. ml |
|---|---|
| from 0 to 1.5 | 0.10 |
| from 1.5 to 3 | 0.50 |
| from 3 to 5 | 0.50 |
| from 5 to 10 | 1 |
| from 10 to 25 | 5 |
| from 25 to 100 | 25 |

| Cat. No. | 3621 38 |
|---|---|

## Sedimentation Cones

**With stopcock.**
Pack of 1.

| Cat. No. | 3876 62 |
|---|---|

**Without stopcock.**
Pack of 4.

| Cat. No. | 3873 62 |
|---|---|

## Imhoff sedimentation cones

**SILBERBRAND. Graduated to 100 ml, ring mark at 1000 ml.**

Borosilicate glass 3.3. DIN 12672.

| Graduation range ml | Subdiv. ml | Error limit ± ml |
|---|---|---|
| 0 - 2 | 0.1 | 0.1 |
| 2 - 10 | 0.5 | 0.5 |
| 10 - 40 | 1 | 1 |
| 40 - 100 | 2 | 2 |
| Ring mark 1000 | – | 10 |



## Imhoff sedimentation cone

**SILBERBRAND.**
**Graduated to 1000 ml.**

Borosilicate glass 3.3. DIN 12672.
Without stopcock. Pack of 4.

| Graduation range ml | Subdiv. ml | Error limit ± ml |
|---|---|---|
| 0 - 2 | 0.1 | 0.1 |
| 2 - 10 | 0.5 | 0.5 |
| 10 - 40 | 1 | 1 |
| 40 - 100 | 2 | 2 |
| 100 - 1000 | 50 | 10 |

| Cat. No. | 3874 62 |
|---|---|

## Imhoff sedimentation cone SAN

**PLASTIBRAND®.**
**Graduated to 1000 ml.**

SAN, transparent. DIN 12672.
Screw cap allows drainage. Withstands temperatures up to 85 °C. Pack of 1.

| Graduation range ml | Subdiv. ml | Error limit ± ml |
|---|---|---|
| 0 - 2 | 0.1 | 0.1 |
| 2 - 10 | 0.5 | 0.5 |
| 10 - 40 | 1 | 1 |
| 40 - 100 | 2 | 2 |
| 100 - 1000 | 50 | 10 |

| Cat. No. | 3880 00 |
|---|---|



## Rack for glass and plastic sedimentation cones

PMMA/PP, holds 2 Imhoff sedimentation cones (glass or plastic; with and without stopcock). Compact design and easy to carry, even with cones filled. Pack of 1.

| Length mm | Width mm | Height mm | Cat. No. |
|---|---|---|---|
| 300 | 130 | 400 | 3880 60 |

## Rack for plastic sedimentation cones

PMMA/PP, holds 2 plastic sedimentation cones. Compact design and easy to carry, even with cones filled. Pack of 1.

| Length mm | Width mm | Height mm | Cat. No. |
|---|---|---|---|
| 300 | 130 | 315 | 3880 50 |

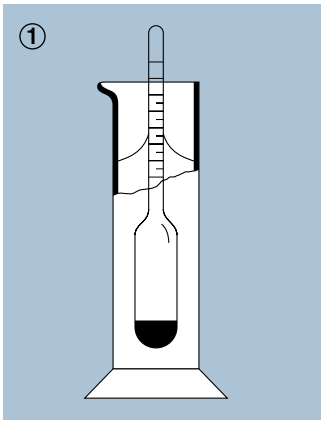


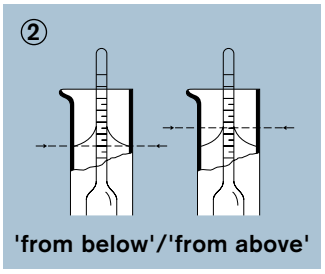
# Hydrometers

## Measuring Procedures

**Hydrometers determine the density of liquids or the concentration of dissolved matter.**

Density is frequently indicated in g/cm³ (g/ml) or in °Baumé. Concentration is indicated in percentage by volume (Vol.%) or in percentage by mass (Weight%). Permissible deviations are within ± 2 graduation marks.




### Measuring procedure

Pour the sample into a transparent cylinder (see fig. 1) and adjust its temperature to the indicated reference temperature of the hydrometer. Immediately before measuring, mix well with a glass rod to reduce differing sample densities and temperatures.

A clean hydrometer should only be touched above the scale. Liquid should not adhere more than 5 mm above the reading point.

The meniscus should remain even and not change its shape or height when the stem moves up and down. Hydrometer should first be cleaned carefully in Mucasol® (see page 262).

Once the hydrometer has reached its equilibrium, (floating freely without touching the walls of the cylinder) the density is read "from below" for transparent samples, non-transparent samples are read "from above". (see fig. 2).

Check the temperature of the sample immediately after the reading. Maximum hydrometer measuring temperature should not exceed 70 °C.

### Temperature correction

#### 1. Measuring instrument

Certain applications may require a correction to account for the thermal expansion of the hydrometer glass, if the measuring temperature deviates from the reference temperature of the hydrometer. This factor corrects the result corresponding measuring temperature.

$K_t = (1-\gamma\,(t - t_0))\,\rho$

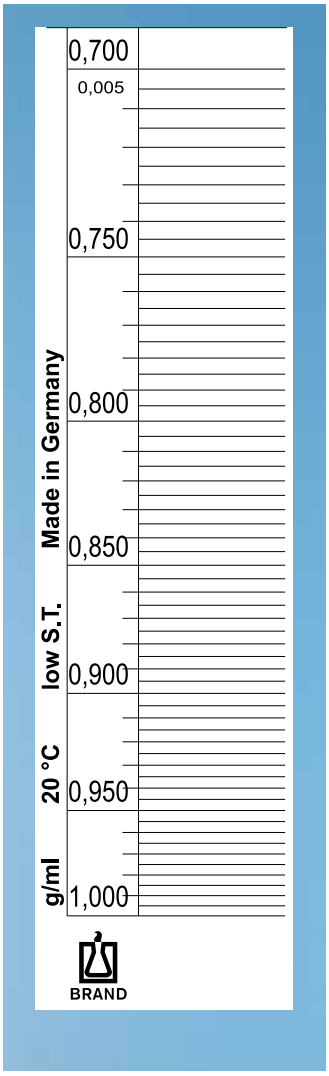
| | |
|---|---|
| $K_t$ | For the density after correction |
| $\gamma$ | Volume expansion coefficient of the hydrometer glass $(25 \pm 2)\ 10^{-6}\ K^{-1}$ |
| t | Measuring temperature °C |
| $t_0$ | Reference temperature °C |
| $\rho$ | Density reading g/ml |

#### 2. Sample

Conversion tables for measured densities to different temperature can be found in many chemical references. These tables can provide expansion coefficients and densities for different sample temperatures and concentrations.

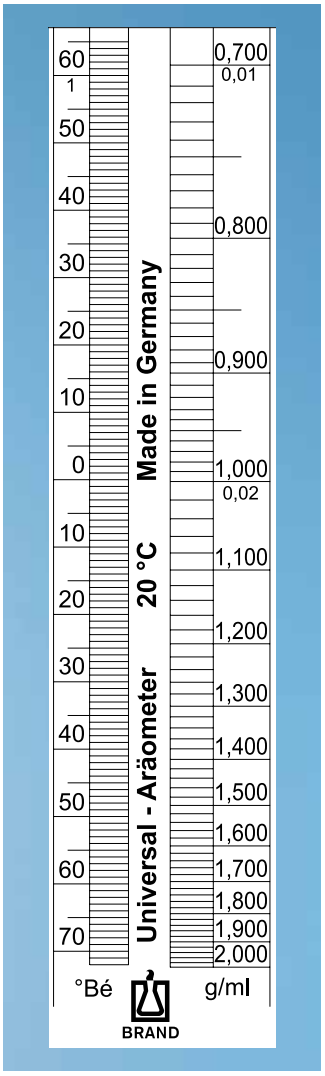
**Note:**
All scales are shown in original size.

## Range finder hydrometers




Subdivisions 0.005 g/cm³, reference temperature 20 °C. Without thermometer, approx. 260 - 300 mm long. Pack of 1.

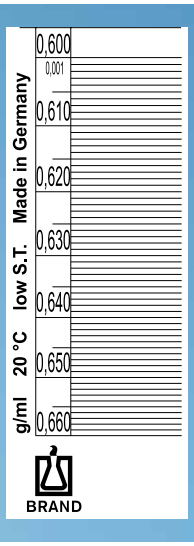
| Range g/cm³ | Cat. No. |
|---|---|
| 0.700 - 1.000 | 9700 10 |
| 1.000 - 1.500 | 9700 12 |
| 1.500 - 2.000 | 9700 14 |




Subdivisions 0.01 g/cm³, reference temperature 20 °C. Without thermometer, approx. 360 mm long. Pack of 1.

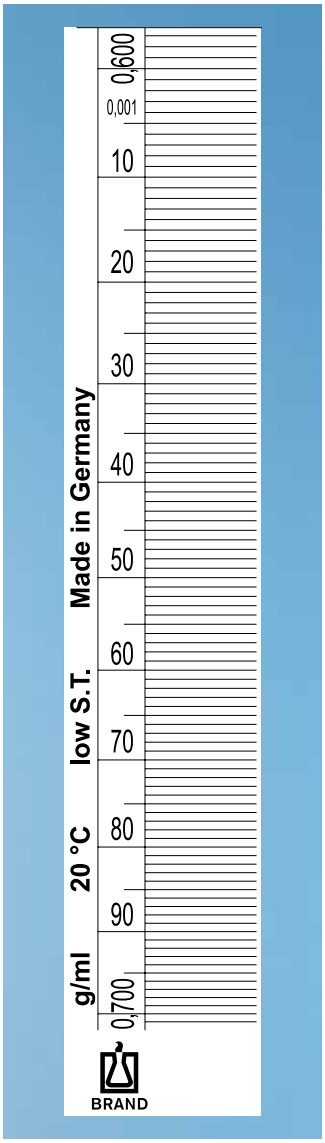
| Range g/cm³ | Cat. No. |
|---|---|
| 0.700 - 2.000 | 9705 10 |

## General purpose hydrometers




Subdivisions 0.001 g/cm³, reference temperature 20 °C. Without thermometer, approx. 160 mm long. Pack of 1.

| Range g/cm³ | Cat. No. |
|---|---|
| 0.600 - 0.660 | 9660 30 |
| 0.650 - 0.710 | 9660 31 |
| 0.700 - 0.760 | 9660 32 |
| 0.760 - 0.820 | 9660 33 |
| 0.820 - 0.880 | 9660 34 |
| 0.880 - 0.940 | 9660 35 |
| 0.940 - 1.000 | 9660 36 |
| 1.000 - 1.060 | 9660 37 |
| 1.060 - 1.120 | 9660 38 |
| 1.120 - 1.180 | 9660 39 |
| 1.180 - 1.240 | 9660 40 |
| 1.240 - 1.300 | 9660 41 |
| 1.300 - 1.360 | 9660 42 |
| 1.360 - 1.420 | 9660 43 |
| 1.420 - 1.480 | 9660 44 |
| 1.480 - 1.540 | 9660 45 |
| 1.540 - 1.600 | 9660 46 |
| 1.600 - 1.660 | 9660 47 |
| 1.660 - 1.720 | 9660 48 |
| 1.720 - 1.780 | 9660 49 |
| 1.780 - 1.840 | 966050 |
| 1.840 - 1.900 | 9660 51 |
| 1.900 - 1.960 | 9660 52 |
| 1.960 - 2.020 | 9660 53 |

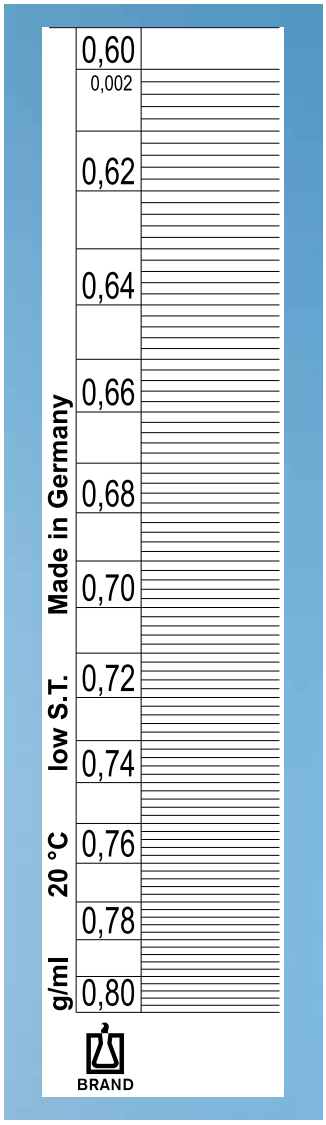



Subdivisions 0.001 g/cm³, reference temperature 20 °C. Without thermometer, approx. 300 mm long. Pack of 1.

| Range g/cm³ | Cat. No. |
|---|---|
| 0.600 - 0.700 | 9685 10 |
| 0.700 - 0.800 | 9685 11 |
| 0.800 - 0.900 | 9685 12 |
| 0.900 - 1.000 | 9685 13 |
| 1.000 - 1.100 | 9685 14 |
| 1.100 - 1.200 | 9685 15 |
| 1.200 - 1.300 | 9685 16 |
| 1.300 - 1.400 | 9685 17 |
| 1.400 - 1.500 | 9685 18 |
| 1.500 - 1.600 | 9685 19 |
| 1.600 - 1.700 | 9685 20 |
| 1.700 - 1.800 | 9685 21 |
| 1.800 - 1.900 | 9685 22 |
| 1.900 - 2.000 | 9685 23 |



## General purpose hydrometers

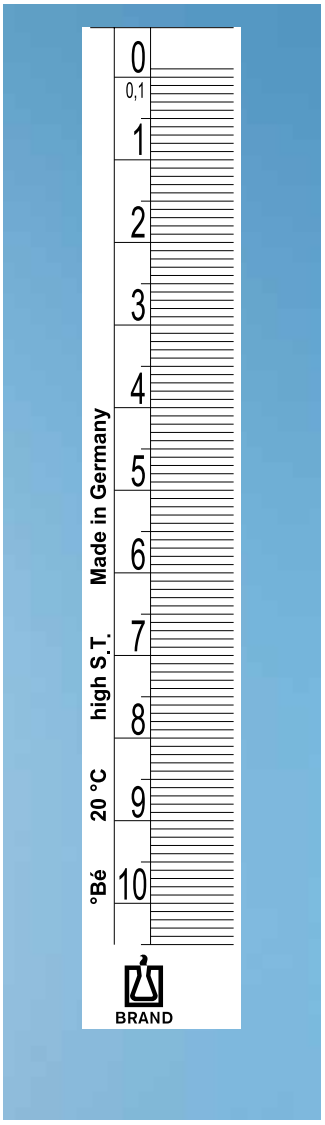



**Without thermometer:**
Subdivision 0.002 g/cm³, reference temperature 20 °C. Approx. 280 mm long. Pack of 1.

**With thermometer:**
Thermometer range: 0-30/40 °C (subdivision 1 °C). Petroleum filled, blue colored. Approx. 330 mm long. Pack of 1.

| Range g/cm³ | without thermometer Cat. No. | with thermometer Cat. No. |
|---|---|---|
| 0.600 - 0.800 | 9695 10 | 9696 10 |
| 0.800 - 1.000 | 9695 11 | 9696 11 |
| 1.000 - 1.200 | 9695 12 | 9696 12 |
| 1.200 - 1.400 | 9695 13 | 9696 13 |
| 1.400 - 1.600 | 9695 14 | 9696 14 |
| 1.600 - 1.800 | 9695 15 | 9696 15 |
| 1.800 - 2.000 | 9695 16 | 9696 16 |

## Hydrometers Baumé pattern




For aqueous solutions and liquids with similar surface tensions.

The advantage of this pattern is that the distances between graduation marks remain constant throughout the entire range.

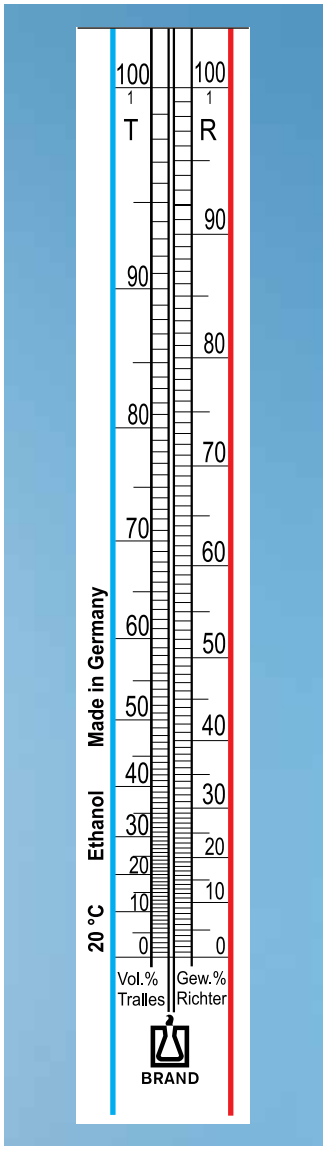
**Without thermometer.**
Reference temperature 20 °C. Pack of 1.

| Range °Bé | Subdivisions °Bé | Length approx. mm | Cat. No. |
|---|---|---|---|
| 0 - 35 | 1 | 250 | 9715 28 |
| 0 - 50 | 1 | 250 | 9715 34 |
| 0 - 70 | 1 | 250 | 9715 35 |
| 0 - 10 | 0.1 | 285 | 9715 36 |
| 10 - 20 | 0.1 | 285 | 9715 37 |
| 20 - 30 | 0.1 | 285 | 9715 38 |
| 30 - 40 | 0.1 | 285 | 9715 39 |
| 40 - 50 | 0.1 | 285 | 9715 40 |
| 50 - 60 | 0.1 | 285 | 9715 41 |
| 60 - 70 | 0.1 | 285 | 9715 42 |

The range 0-70 °C Bé corresponds to the range 1-1.94 g/cm³.



## General purpose alcoholometers




### Richter + Tralles pattern

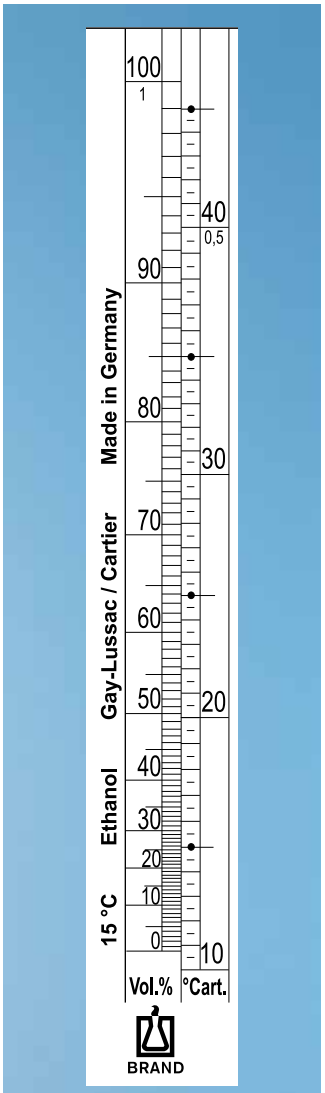
Subdivisions:
1 weight % / 1 vol.%, reference temperature 20 °C, range 0-100% (weight/vol.). Pack of 1.

**Without thermometer:**
approx. 260 mm long

| Cat. No. | 9805 10 |
|---|---|

**With thermometer:**
approx. 330 mm long, thermometer range: 0-30/ 40 °C (subdivisions 1 °C), petroleum filled, blue colored.

| Cat. No. | 9805 60 |
|---|---|




### Gay-Lussac + Cartier pattern

Subdivisions:
1 vol.% / 0.5 °Cartier, reference temperature 15 °C, range 0-100 vol.% / 10-45 °Cartier. Pack of 1.

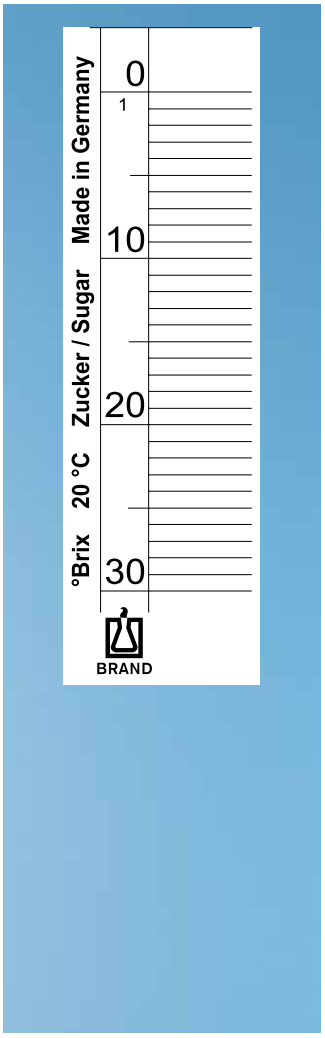
**Without thermometer:**
approx. 260 mm long

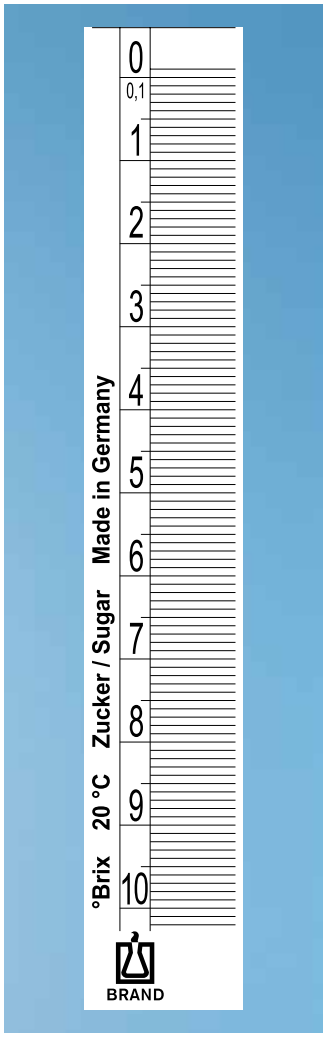
| Cat. No. | 9803 10 |
|---|---|

**With thermometer:**
approx. 330 mm long, thermometer range: 0-30/ 40 °C (subdivisions 1 °C), petroleum filled, blue colored.

| Cat. No. | 9803 60 |
|---|---|

## Sugar hydrometers




**Saccharimeters, Brix pattern (Sugar hydrometers)**
(1 °Brix = 1% sugar solution)

Subdivisions: 1 °Brix.
Reference temperature 20 °C.

**Without thermometer:**
approx. 210 mm long.
Pack of 1.

| Range °Brix | Cat. No. |
|---|---|
| 0 - 30 | 9844 17 |
| 30 - 60 | 9844 18 |
| 60 - 90 | 9844 16 |

Subdivisions: 0.1 °Brix.
Reference temperature 20 °C.

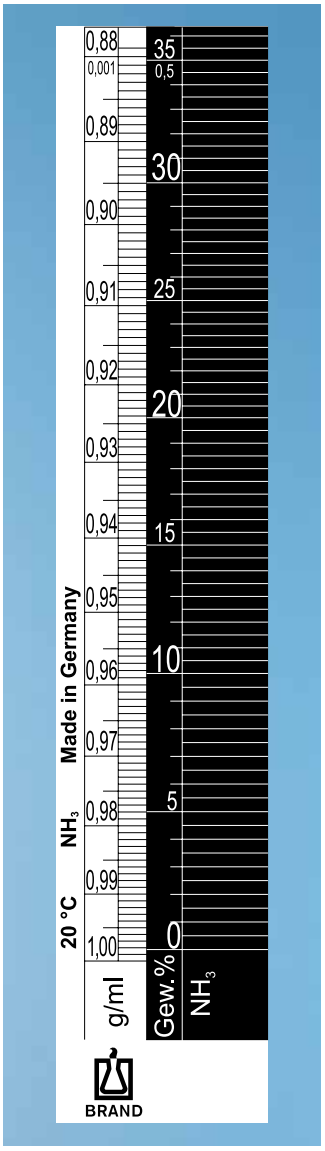
**With thermometer:**
approx. 330 mm long.
Thermometer range: 0-40/ 50 °C (subdivisions 1 °C).
petroleum filled, blue colored.
Pack of 1.

| Range °Brix | Cat. No. |
|---|---|
| 0 - 10 | 9847 10 |
| 10 - 20 | 9847 11 |
| 20 - 30 | 9847 12 |
| 30 - 40 | 9847 13 |
| 40 - 50 | 9847 14 |
| 50 - 60 | 9847 15 |



## Special-purpose hydrometers

Reference temperature 20 °C.
Without thermometer, approx. 290-320 mm long.
All instruments listed below are supplied with double scales (weight % and density), eliminating the need for cross reference documentation.
Pack of 1.




| for | Range Weight % | Subdivision Weight % | Cat. No. |
|---|---|---|---|
| Ammonium hydroxide, $NH_4OH$ | 0 - 35 | 0.5 | 9875 10 |
| Sodium chloride, NaCl | 0 - 27 | 0.5 | 9926 10 |
| Hydrochloric acid, HCl | 0 - 40 | 0.5 | 9929 10 |

## Hydrometer cylinders

DURAN®
Ungraduated, with hexagonal base and spout.
Pack of 1.

| Capac. ml | i. H. mm | i. Ø mm | Cat. No. |
|---|---|---|---|
| 250 | 310 | 35 | 9874 02 |
| 500 | 340 | 50 | 9874 04 |

## Hydrometer cylinders

PP. With spout and overflow vessel. Hydrometers can be read while the cylinder is completely filled. The elasticity of the jar reduces the risk of hydrometer breakage.
Pack of 1.

| Capac. ml | i. H. mm | i. Ø mm | Cat. No. |
|---|---|---|---|
| 500 | 350 | 50 | 500 00 |



# Thermometer

**BRAND thermometers – premium instruments for measuring temperature.**

These high quality thermometers are manufactured in a single casting for a long service life. The dark amber stain is integrated with the glass surface, and is particularly resistant to chemical and physical corrosion.

**Note:** At temperatures above 150 °C, the thermometer must be carefully preheated approximately to the temperature to be measured before immersion in the fluid.

### GOLDBRAND

Precision thermometers, suitable for official certification or officially certified (the official certificate is valid for 15 years).

The accuracy is within the PTB* approved error limits.

### SILBERBRAND

General-purpose thermometers for routine applications.

The accuracy remains within twice the PTB* approved error limits.

* PTB (Physikalisch-Technische Bundesanstalt): German Federal Institute of Physics and Metrology

### Solid-stem thermometer, yellow coated

The vivid yellow coating on the back of these thermometers clearly contrasts the mercury column and graduations.

### Enclosed-scale thermometer

BRAND also carries thermometers with opal glass scales.

### Error limits for thermometers

The following error limits are according to "Eichordnung EO 14-1", the German Federal Weights and Measures Regulations.

For thermometers calibrated for total immersion containing **non-wetting** thermometric liquid (e.g., mercury and mercury-thallium alloy) and for thermometers containing **wetting** thermometric liquid (e.g., toluene, pentane and petroleum).

### Official error limits for thermometers containing non-wetting thermometric liquids, for the subdivisions:

| Temperature range from °C/to °C | 0.05 °C | 0.1 °C | 0.2 °C | 0,5 °C | 1 °C | 2 °C | 5 °C |
|---|---|---|---|---|---|---|---|
| -58 / -10 | – | ± 0.3 | ± 0.4 | ± 0.5 | ± 1 | ± 2 | ± 5 |
| -10 / 110 | ± 0.1 | ± 0.2 | ± 0.3 | ± 0.5 | ± 1 | ± 2 | ± 5 |
| 110 / 210 | – | – | ± 0.4 | ± 0.5 | ± 1 | ± 2 | ± 5 |
| 210 / 410 | – | – | – | ± 1 | ± 2 | ± 2 | ± 5 |
| 410 / 610 | – | – | – | - | ± 3 | ± 4 | ± 5 |

### Official error limits for thermometers containing wetting thermometric liquids, for the subdivisions:

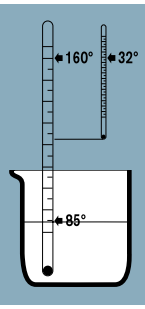
| Temperature range from °C/to °C | 0.5 °C | 1 °C | 2 °C | 5 °C |
|---|---|---|---|---|
| -200 / -110 | – | ± 3 | ± 4 | ± 5 |
| -110 / -10 | ± 1 | ± 2 | ± 4 | ± 5 |
| -10 / 110 | ± 1 | ± 2 | ± 3 | ± 5 |
| 110 / 210 | – | ± 3 | ± 4 | ± 5 |

### Calibration / Temperature correction (approximation)

Unless marked otherwise, thermometers are calibrated "for total immersion".
This means that the meniscus of the mercury column is level with the surface of the liquid being measured.
If part of the mercury column is visible above the liquid surface, a correction may be necessary.

Equation for correction:

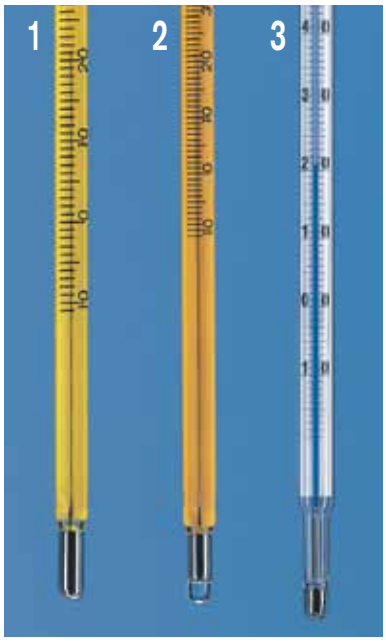
$$t_k = t + \frac{(t-t')\,n}{6250}$$




**Example:**

| | |
|---|---|
| Temp. reading: | **t = 160 °C** |
| Immersion point: | **$t^x$ = 85 °C** |
| Emerging mercury column: | |
| Mean temperature: | **t' = 32 °C** |
| Length in °C (on scale): | **n = 160-85 = 75** |
| Corrected temp.: | **$t_k$ = 161.5 °C** |






## 1 Solid-stem thermometers

**for general purpose, SILBERBRAND**

Calibrated for total immersion. Stem Ø 6-7 mm, yellow coated, upper end round. Graduation and inscriptions in dark amber stain. Measuring capillary of oval cross section improves readability. Pack of 1.

| Range from / to °C | Subdivisions °C | Overall length mm | Filling | Cat. No. |
|---|---|---|---|---|
| -35 / 50 | 1 | 260 | Mercury | 8000 01 |
| -10 / 50 | 1 | 250 | Mercury | 8000 02 |
| -10 / 110 | 1 | 280 | Mercury | 8000 03 |
| -10 / 150 | 1 | 280 | Mercury | 8000 04 |
| -10 / 200 | 1 | 300 | Mercury | 8000 05 |
| -10 / 250 | 2 | 320 | Mercury | 8000 96 |
| -10 / 300 | 2 | 320 | Mercury | 8000 97 |
| -10 / 360 | 2 | 320 | Mercury | 8000 98 |
| -10 / 410 | 2 | 350 | Mercury | 8000 99 |
| -35 / 50 | 1 | 260 | Petroleum, red colored | 8001 01 |
| -10 / 100 | 1 | 260 | Petroleum, red colored | 8001 03 |
| -10 / 150 | 1 | 260 | Petroleum, red colored | 8001 04 |

## 2 Stirring thermometers, solid-stem

**for general purpose, SILBERBRAND**

Calibrated for total immersion. With reinforced bottom end for stirring in beakers, etc. Stem Ø 6-7 mm, yellow coated, upper end round. Graduation and inscriptions in dark amber stain. Measuring capillary of oval cross section for better readability. Mercury filled. Pack of 1.

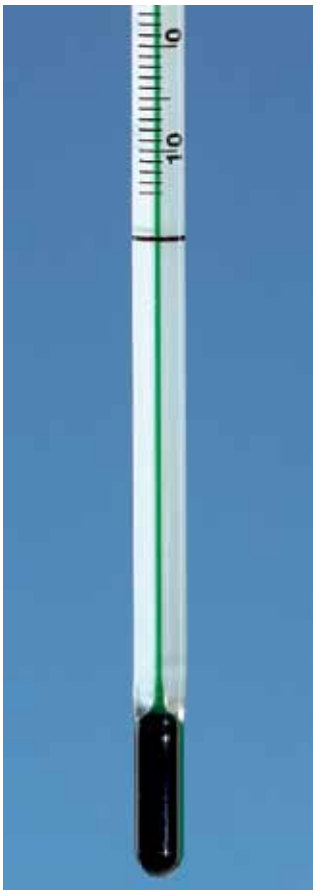
| Range from / to °C | Subdivisions in °C | Overall length mm | Cat. No. |
|---|---|---|---|
| -10 / 50 | 1 | 300 | 8005 02 |
| -10 / 110 | 1 | 300 | 8005 03 |
| -10 / 150 | 1 | 300 | 8005 04 |
| -10 / 220 | 1 | 300 | 8005 06 |
| 0 / 360 | 2 | 300 | 8005 48 |
| 0 / 50 | 1 | 150 | 8006 02 |
| -10 / 110 | 1 | 150 | 8006 03 |
| 0 / 150 | 1 | 150 | 8006 04 |
| 0 / 220 | 2 | 150 | 8006 46 |
| 0 / 360 | 2 | 150 | 8006 48 |

## 3 Enclosed-scale thermometers

**for general purpose, SILBERBRAND**

Calibrated for total immersion. Tube Ø 7-8 mm, upper end with ring. Opal glass scale with black graduation and inscriptions. Prismatic measuring capillary, in brilliant blue. Mercury filled. Pack of 1.

| Range from / to °C | Subdivisions in °C | Overall length mm | Cat. No. |
|---|---|---|---|
| -35 / 50 | 1 | 260 | 8004 01 |
| -10 / 50 | 1 | 200 | 8004 02 |
| -10 / 100 | 1 | 260 | 8004 03 |
| -10 / 150 | 1 | 260 | 8004 04 |
| -10 / 200 | 1 | 300 | 8004 05 |
| -10 / 250 | 1 | 300 | 8004 06 |
| -10 / 300 | 1 | 340 | 8004 07 |
| -10 / 360 | 1 | 340 | 8004 08 |
| -10 / 420 | 1 | 340 | 8004 09 |





## Solid-stem thermometers, without mercury

**for general purpose, SILBERBRAND**

Calibrated for partial immersion. Immersion depth 76 mm. Stem Ø 6-7 mm, white coated, upper end with ring. Graduation and inscriptions in dark amber stain. Indicator fluid is a green, wetting, thermometric liquid that is also biodegradable. Measuring capillary with large cross section for improved readability. Pack of 1.

| Range from / to °C | Subdivision °C | Overall length mm | Cat. No. |
|---|---|---|---|
| -10 / 110 | 1 | 300 | 8002 00 |
| -10 / 110 | 0.5 | 300 | 8002 02 |
| -10 / 150 | 1 | 300 | 8002 04 |
| -10 / 250* | 2 | 300 | 8002 06 |
| -10 / 360* | 2 | 300 | 8002 08 |

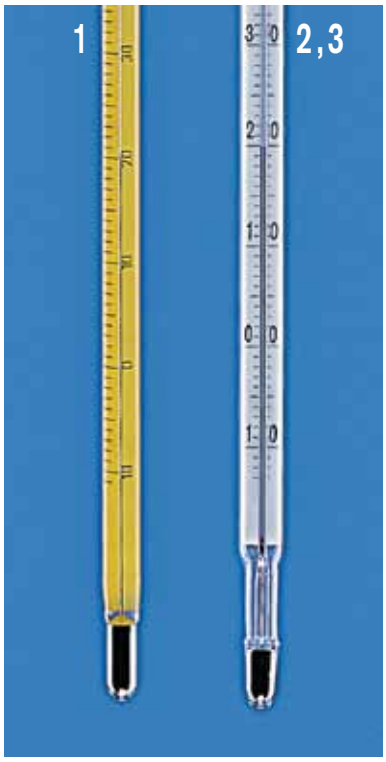
* The color may fade due to thermal effects over time

## Pocket thermometers, solid-stem

**for general purpose, SILBERBRAND**

In nickel-plated metal case with bayonet catch and clip. Case Ø 12 mm, overall length 140 mm. Calibrated for total immersion. Stem Ø 6-7 mm, yellow coated. Graduation and inscriptions in dark amber stain. Measuring capillary with oval cross section for improved readability. Mercury filled. Pack of 1.

| Range from / to °C | Subdivisions °C | Cat. No. |
|---|---|---|
| -30 / 50 | 1 | 8385 01 |
| 0 / 100 | 1 | 8385 03 |




## 1 Precision solid-stem thermometers

**suitable for official certification, GOLDBRAND**

Calibrated for total immersion. Stem Ø 6-7 mm, yellow coated, top end round. Black graduation and inscriptions. Measuring capillary with oval cross section for improved readability. Mercury filled. Pack of 1.

| Range from / to °C | Subdivision °C | Overall length mm | Suitable for official certification* Cat. No. |
|---|---|---|---|
| -10 / 50 | 1 | 250 | 8040 02 |
| 0 / 50 | 0.5 | 250 | 8040 12 |
| 0 / 50 | 0.2 | 320 | 8040 22 |
| 0 / 50 | 0.1 | 420 | 8040 32 |
| -10 / 110 | 1 | 300 | 8040 03 |
| 0 / 100 | 0.5 | 300 | 8040 13 |
| 0 / 100 | 0.2 | 400 | 8040 23 |
| 0 / 100 | 0.1 | 550 | 8040 33 |
| -10 / 150 | 1 | 300 | 8040 04 |
| 0 / 150 | 0.5 | 320 | 8040 14 |
| 0 / 150 | 0.2 | 450 | 8040 24 |
| -10 / 250 | 1 | 350 | 8040 06 |
| 0 / 250 | 0.5 | 350 | 8040 16 |
| -10 / 360 | 1 | 380 | 8040 08 |
| 0 / 360 | 0.5 | 450 | 8040 18 |
| -10 / 410 | 1 | 400 | 8040 09 |

* upon request, officially calibrated with calibration certificate and/or DKD calibration certificate

## 2 Precision thermometers, enclosed-scale pattern

**DIN 12775, GOLDBRAND**

Calibrated for total immersion. Tube Ø 7.5-8.5 mm, upper end with Richter-pattern top and knob. Opal glass scale with black graduation and inscriptions. Prismatic measuring capillary, in brilliant blue. Mercury filled. Pack of 1.

| Range from / to °C | Subdivision °C | Overall length mm | Suitable for official certification* Cat. No. |
|---|---|---|---|
| 0 / 50 | 0.5 | 220 | 8045 12 |
| 0 / 50 | 0.1 | 420 | 8045 32 |
| 0 / 100 ** | 1 | 305 | 8045 03 |
| 0 / 100 | 0.5 | 270 | 8045 13 |
| 0 / 100 | 0.1 | 550 | 8045 33 |
| 0 / 150 ** | 1 | 305 | 8045 04 |
| 0 / 150 | 0.5 | 350 | 8045 14 |
| 0 / 250 ** | 1 | 350 | 8045 06 |
| 0 / 250 | 0.5 | 420 | 8045 16 |
| 0 / 360 ** | 1 | 380 | 8045 08 |

* upon request, officially calibrated with calibration certificate and/or DKD calibration certificate
** to DIN 12778

## 3 Maximum-precision thermometers, enclosed-scale p.

**for centrifugation, GOLDBRAND**

For measurements in the autoclave. Reading is carried out at 23 °C. No temperature correction is required. Withstands vacuum and pressure to 2 bar. Calibrated for total immersion. Tube Ø 7-8 mm, upper end with Richter-pattern top and knob. Opal glass scale with black graduation and inscriptions. Prismatic measuring capillary. Mercury filled. Pack of 1.

| Range from / to °C | Subdivision °C | Overall length mm | Suitable for official certification* Cat. No. |
|---|---|---|---|
| -10 / 150 | 1 | 260 | 8206 00 |

* upon request, officially calibrated with calibration certificate and/or DKD calibration certificate


## 1 Precision Anschutz thermometer

**(Precision solid-stem thermometers), GOLDBRAND**

Calibrated for total immersion. Stem Ø 5-6 mm, yellow coated, upper end with knob. Black graduation and inscriptions. Measuring capillary with oval cross section for improved readability. Mercury filled. Pack of 1.

| Range from / to °C | Subdivision °C | Overall length mm | Suitable for official certification/ calibratable Cat. No. |
|---|---|---|---|
| 0 / 50 | 0.1 | 340 | 8080 32* |
| 50 / 100 | 0.1 | 340 | 8080 33* |
| 100 / 150 | 0.1 | 340 | 8080 34** |
| 150 / 200 | 0.1 | 340 | 8080 35** |
| 200 / 250 | 0.1 | 340 | 8080 36** |
| 250 / 300 | 0.1 | 340 | 8080 37** |
| 300 / 360 | 0.1 | 340 | 8080 38** |

* upon request, officially calibrated with calibration certificate and/or DKD calibration certificate,
** upon request, available officially tested with calibration certificate and/or DKD calibration certificate.

## 2 Precision high-temperature thermometer

**solid-stem thermometer, DIN 12778, GOLDBRAND**

Calibrated for total immersion. Stem Ø 5-7 mm, matt finish on revere side, upper end drawn out and sealed. Black graduation and inscriptions. Measuring capillary with large cross section for improved readability. Mercury filled. Pack of 1.

| Range from / to °C | Subdivision °C | Overall length mm | Suitable for official certification* Cat. No. |
|---|---|---|---|
| 0 / 610 | 2 | 450 | 8120 10 |

* upon request, officially calibrated with calibration certificate and/or DKD calibration certificate

## 3 Precision low-temperature thermometer

**solid-stem thermometer, GOLDBRAND**

Calibrated for total immersion. Stem Ø 6-8 mm, upper end round. Black graduation and inscriptions. Measuring capillary with large cross section for improved readability. Pack of 1.

| Range from / to °C | Subdivision °C | Overall length mm | Filling | Suitable for official certification* Cat. No. |
|---|---|---|---|---|
| -38 / 50 | 1 | 260 | Hg | 8050 01 |
| -38 / 50 | 0.5 | 280 | Hg | 8050 11 |
| -50 / 30 | 1 | 280 | Toluene, dyed red | 8052 02 |
| -50 / 30 | 0.5 | 280 | Toluene, dyed red | 8052 12 |
| -100 / 30** | 1 | 305 | Toluene, dyed red | 8052 03 |
| -100 / 30 | 0.5 | 320 | Toluene, dyed red | 8052 13 |

* upon request, officially calibrated with calibration certificate and/or DKD calibration certificate,
** to DIN 12778


## 1 Dropping point thermometer, Ubbelohde pattern

**Precision enclosed-scale thermometer with very small, rapid response mercury bulb, to DIN 12 785, GOLDBRAND**

Calibrated for total immersion. Top tube Ø 9.0-9.6 mm, bottom 3.3-3.7 mm.
Upper end round. Opal glass scale with black graduation and inscriptions.
Prismatic measuring capillary. Mercury filled. Mounted with metal fitting. Pack of 1.

| Range from / to °C | Subdivision °C | Overall length mm | Suitable for official certification* Cat. No. |
|---|---|---|---|
| 0 / 110 | 1 | 240 | 8711 01 |

* upon request, officially calibrated with calibration certificate and/or DKD calibration certificate

## 2 Cloud point and setting point thermometers

**Precision enclosed-scale thermometer to DIN 12 785, GOLDBRAND**

Calibrated for 180 mm immersion. Top tube Ø 9-11 mm, bottom 4.5-5.5 mm.
Upper end round. Opal glass scale with black graduation and inscriptions.
Prismatic measuring capillary. Toluene filled, dyed red. Pack of 1.

| Range from / to °C | Subdivision °C | Overall length mm | Suitable for official certification* Cat. No. |
|---|---|---|---|
| -70 / 50 | 1 | 360 | 8705 03 |

* upon request, officially calibrated with calibration certificate and/or DKD calibration certificate

## 3 Congealing point thermometer

**Precision solid-stem thermometer, prismatic, to DIN 12 785, GOLDBRAND**

Calibrated for total immersion. Stem Ø 6-7 mm, yellow coated, upper end with ring.
Black graduation and inscriptions. Measuring capillary of oval cross section for improved readability. Mercury filled. Pack of 1.

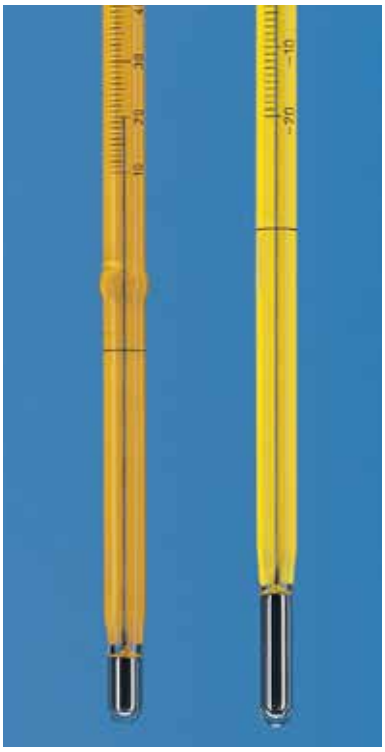
| Range from / to °C | Subdivision °C | Overall length mm | Suitable for official certification* Cat. No. |
|---|---|---|---|
| 0 / 100 | 0.5 | 300 | 8668 01 |

* upon request, officially calibrated with calibration certificate and/or DKD calibration certificate

# ASTM thermometers

| ASTM No. | Range from / to °C | Subdivision °C | Overall length mm | Immersion depth mm | Suitable for official certification*/calibratable Cat. No. |
|---|---|---|---|---|---|
| 1 C | -20 / 150 | 1 | 322 | 76 | 8800 01 |
| 2 C | -5 / 300 | 1 | 390 | 76 | 8800 02 |
| 3 C | -5 / 400 | 1 | 415 | 76 | 8800 03 |
| 5 C | -38 / 50 | 1 | 230 | 108 | 8800 04 |
| 6 C | -80 / 20 | 1 | 230 | 76 | 8800 05 |
| 7 C | -2 / 300 | 1 | 385 | total immers. | 8800 06 |
| 8 C | -2 / 400 | 1 | 385 | total immers. | 8800 07 |
| 9 C[W] | -5 / 110 | 0.5 | 290 | 57 | 8800 08 |
| 10 C[W] | 90 / 370 | 2 | 290 | 57 | 8800 09 |
| 11 C | -6 / 400 | 2 | 310 | 25 | 8800 10 |
| 12 C | -20 / 102 | 0.2 | 420 | total immers. | 8800 11 |
| 14 C | 38 / 82 | 0.1 | 375 | 79 | 8800 13 |
| 15 C | -2 / 80 | 0.2 | 395 | total immers. | 8800 14 |
| 16 C | 30 / 200 | 0.5 | 395 | total immers. | 8800 15 |
| 17 C[W] | 19 / 27 | 0.1 | 275 | total immers. | 8800 16 |
| 18 C[W] | 34 / 42 | 0.1 | 275 | total immers. | 8800 17 |
| 20 C[W] | 57 / 65 | 0.1 | 275 | total immers. | 8800 19 |
| 22 C[W] | 95 / 103 | 0.1 | 275 | total immers. | 8800 21 |
| 23 C | 18 / 28 | 0.2 | 212 | 90 | 8800 22 |
| 24 C | 39 / 54 | 0.2 | 237 | 90 | 8800 23 |
| 33 C | -38 / 42 | 0.2 | 420 | 50 | 8800 27 |
| 34 C | 25 / 105 | 0.2 | 420 | 50 | 8800 28 |
| 35 C | 90 / 170 | 0.2 | 420 | 50 | 8800 29 |
| 36 C | -2 / 68 | 0.2 | 405 | 45 | 8800 30 |
| 37 C | -2 / 52 | 0.2 | 395 | 100 | 8800 31 |
| 39 C | 48 / 102 | 0.2 | 395 | 100 | 8800 33 |
| 40 C | 72 / 126 | 0.2 | 395 | 100 | 8800 34 |
| 41 C | 98 / 152 | 0.2 | 395 | 100 | 8800 35 |
| 42 C | 95 / 255 | 0.5 | 395 | 100 | 8800 36 |
| 44 C[T] | 18.6 / 21.4 | 0.05 | 305 | total immers. | 8800 86 |
| 45 C[T] | 23.6 / 26.4 | 0.05 | 305 | total immers. | 8800 87 |
| 46 C[T] | 48.6 / 51.4 | 0.05 | 305 | total immers. | 8800 88 |
| 49 C | 20 / 70 | 0.2 | 305 | 65 | 8800 37 |
| 54 C | 20 / 100.6 | 0.2 | 310 | total immers. | 8800 90 |
| 56 C | 19 / 35 | 0.02 | 585 | total immers. | 8800 40 |
| 57 C[W] | -20 / 50 | 0.5 | 287 | 57 | 8800 41 |
| 61 C | 32 / 127 | 0.2 | 380 | 79 | 8800 42 |
| 62 C | -38 / 2 | 0.1 | 379 | total immers. | 8800 43 |
| 63 C | -8 / 32 | 0.1 | 379 | total immers. | 8800 44 |
| 64 C[T] | 25 / 55 | 0.1 | 379 | total immers. | 8800 45 |
| 66 C[T] | 75 / 105 | 0.1 | 379 | total immers. | 8800 47 |
| 67 C[T] | 95 / 155 | 0.2 | 379 | total immers. | 8800 48 |
| 82 C[W] | -15 / 105 | 1 | 162 | 30 | 8800 52 |
| 83 C[W] | 15 / 70 | 1 | 171 | 40 | 8800 53 |
| 86 C[W] | 95 / 175 | 1 | 167 | 35 | 8800 56 |
| 88 C[W] | 10 / 200 | 1 | 287 | 57 | 8800 58 |
| 89 C | -20 / 10 | 0.1 | 370 | 76 | 8800 59 |
| 90 C | 0 / 30 | 0.1 | 370 | 76 | 8800 60 |
| 91 C | 20 / 50 | 0.1 | 370 | 76 | 8800 61 |
| 92 C | 40 / 70 | 0.1 | 370 | 76 | 8800 62 |
| 93 C | 60 / 90 | 0.1 | 370 | 76 | 8800 63 |
| 94 C | 80 / 110 | 0.1 | 370 | 76 | 8800 64 |
| 95 C | 100 / 130 | 0.1 | 370 | 76 | 8800 65** |
| 102 C | 123 / 177 | 0.2 | 395 | 100 | 8800 69 |
| 103 C | 148 / 202 | 0.2 | 395 | 100 | 8800 70 |
| 104 C | 173 / 227 | 0.2 | 395 | 100 | 8800 71** |
| 105 C | 198 / 252 | 0.2 | 395 | 100 | 8800 72** |
| 106 C | 223 / 277 | 0.2 | 395 | 100 | 8800 73** |
| 107 C | 248 / 302 | 0.2 | 395 | 100 | 8800 74** |
| 110 C[T] | 133.6 / 136.4 | 0.05 | 305 | total immers. | 8800 79** |
| 114 C | -80 / 20 | 0.5 | 300 | total immers. | 8800 78 |
| 120 C[T] | 38.6 / 41.4 | 0.05 | 305 | total immers. | 8800 84 |
| 121 C[T] | 98.6 / 101.4 | 0.05 | 305 | total immers. | 8800 85 |

* upon request, officially calibrated with calibration certificate and/or DKD calibration certificate,
** upon request, available officially tested with calibration certificate and/or DKD calibration certificate.
[W] Beaded type, [T] Thermometer with auxiliary scale at 0 °C



## ASTM thermometers

**precision solid-stem thermometers, GOLDBRAND**

Design, accuracy, etc. to meet ASTM ("American Society for Testing and Materials") specifications. Clear contrast through yellow coating. Black graduation and inscriptions. Mercury filled, under nitrogen (except 6 C and 114 C which are toluene filled). All thermometers without metal fittings. Pack of 1.




**a: Immersion depth**
**b: Fitting length**

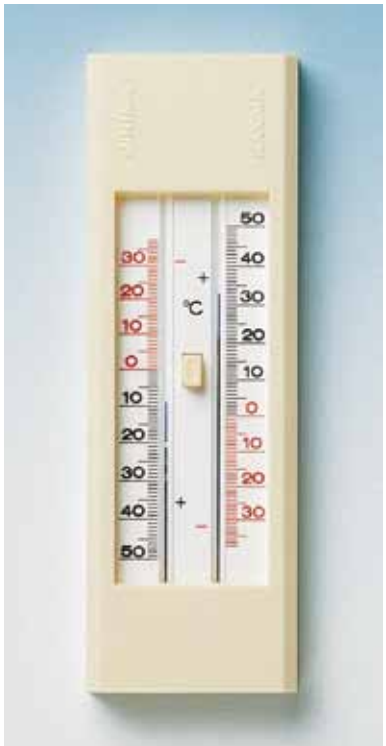
## Precision thermometers with standard ground-glass joint

**enclosed-scale thermometer, NS 14/23, GOLDBRAND**

Calibrated for partial immersion, with indication of the mean mercury column temperature. Top tube Ø 10.5-11.5 mm, bottom 7-8 mm. Upper end with round finished seal. Opal glass scale with black graduation and inscriptions. Prismatic measuring capillary, in brilliant blue. Mercury filled. Pack of 1.

| Range from / to °C | Subdivision °C | Fitting length approx. mm | Immersion depth approx. mm | Suitable for official certification* Cat. No. |
|---|---|---|---|---|
| -10 / 150 | 0.5 | 50 | 27 | 8130 49 |
| -10 / 150 | 0.5 | 60 | 37 | 8130 50 |
| -10 / 150 | 0.5 | 75 | 52 | 8130 51 |
| -10 / 250 | 1 | 50 | 27 | 8130 59 |
| -10 / 250 | 1 | 60 | 37 | 8130 60 |
| -10 / 250 | 1 | 75 | 52 | 8130 61 |

* upon request, officially calibrated with calibration certificate and/or DKD calibration certificate




## Maximum-minimum thermometer Six's pattern

With push button for automatic resetting. Weather resistant plastic housing. Temperature range -30 to 50 °C, subdivisions 1 °C. Ethanol/Mercury, in round capillary. Indicating cursors of blue glass with sealed-in wire tack. Pack of 1.

| Description | Height mm | Width mm | Cat. No. |
|---|---|---|---|
| without top shield, with 2 lateral plastic brackets | 230 | 60 | 8200 00 |
| with removable top shield and eyelet for wall mounting | 230 | 60 | 8205 00 |