Instruction manual

version 3.8 dated 13.06.2012

ZGM 1022

Zehntner-Glossmeter

for the following measuring geometries:

20° and 60°
20° and 75°
20° and 85°

Index

Enclosures:

- Certificate of manufacturer
- Certificate of calibration

Exclusion of liability

The features described in this instruction manual represent the complete technology of this instrument. Those features are either included in the standard delivery or available as options at additional costs.
Illustrations, descriptions as well as the technical specifications conform to the instruction manual at hand at the time of publishing or printing. However, Zehntner GmbH Testing Instruments policy is one of continuous product development. All changes resulting from technical progress, modified construction or similar are reserved without obligation for Zehntner to update.
Some of the images shown in this instruction manual are of a pre-production model and/or are computer generated; therefore the design/features on the final version of this instrument may differ in various aspects.
The instruction manual has been drafted with the utmost care. Nevertheless, errors cannot be entirely excluded. The manufacturer will not be liable for errors in this instruction manual or for damages resulting from any errors. The manufacturer will be grateful at any time for suggestions, proposals for improvement and references to errors.

1. Instrument description

Portable, precision dual angle glossmeter for the determination of gloss.

The following features distinguish for this device:

- The classic glossmeter.
- Objective gloss evaluation with immediate indication of the measured value
- Sturdy construction with aluminium housing and high quality standard.
- Easy to handle.
- Reliable results.

2. Safety precautions and warnings

2.1 Dangers

Attention!

This note is included in this instruction manual wherever it is warned about dangers which will arise to life and limb of persons if the apparatus is handled improperly. Observe these notes and be particularly careful in these cases. Also inform other users on all safety notes. Besides the notes in these instruction manual the generally applicable safety instructions and regulations for prevention of accidents have to be taken into account.

Caution

This symbol marks instructions you should take notice of in order to follow directions, specifications and the correct working process as well as to avoid data loss, damage or destruction of the instrument.

2.2 Safety notes

- Every person working with the ZGM 1022 or maintaining the ZGM 1022 must read and understand the manual completely. In particular the safety precautions and warnings.
- The ZGM 1022 is exclusively intended for the determination of gloss. Any other use is considered as being not in accordance with the intentions of the manufacturer. For damages resulting thereof the manufacturer is not liable; the risk for this is taken by the user alone.
- Reconstruction without permission and modifications of the ZGM 1022 are not permitted. For damages resulting thereof the manufacturer is not liable; the risk for this is taken by the user alone.
- All maintenance and repair work which is not explicitly permitted and described in the present instruction manual (see chapter 9 “Maintenance and storage” on page 10 shall only be carried out by Zehntner GmbH Testing Instruments or your authorized Zehntner agent, otherwise all the guarantee and liability claims will expire.
- For the operation of the ZGM 1022 apply all local safety regulations.

- All maintenance and cleaning work of the ZGM 1022 which are described in the present instruction manual shall be carried out only if the ZGM 1022 is switched off and separated from the power supply voltage. Never immerse the apparatus in water or other liquids: **Danger of short circuit!**
- Only qualified person are allowed to open the housing.

3. Delivery of device

3.1 Damages during carriage

During carriage the ZGM 1022 is to be handled with the usual care. To ensure carriage without damages the device is to be transported in the original packaging and under normal freight conditions. Pushes during carriage are to be avoided.

At the receipt of the goods, you have to check if there are any visible damages at the outer packaging. If the packing is alright, you can sign the receipt documents. If you even suspect by your visual impression that damage has occurred, make a note of the suspected damage on the delivery receipt or freight papers and get the carrier to sign it. Moreover, the forwarding agent/courier service must be held responsible for the damage in writing

If a hidden damage is discovered while unpacking, you have to inform and must held the forwarding agent / courier service immediately in the following way: “When opening the parcel we had to notice that …. etc. etc.“ This superficial checking of the goods has to be done before the time limit of the forwarding agent / courier service expires which is normally within 7 days. However, the period could be less. Hence, it is recommended checking the exact time limit when receiving the goods.

If there are any damages inform also immediately your authorized Zehntner agent or **Zehntner GmbH Testing Instruments** directly.

3.2 Standard delivery

The following parts are included in the delivery:

- 1 ZGM 1022 with two measuring geometries
- 1 integrated accumulator ACC007
- 1 working standard
- 1 zero standard
- 1 battery charger (ACC003 for 230 V / ACC081 for 115V)
- 1 connection cable
- 1 spare lamp with allan key
- 1 screw driver
- 1 certificate of manufacturer
- 1 certificate of calibration
- 1 carrying case

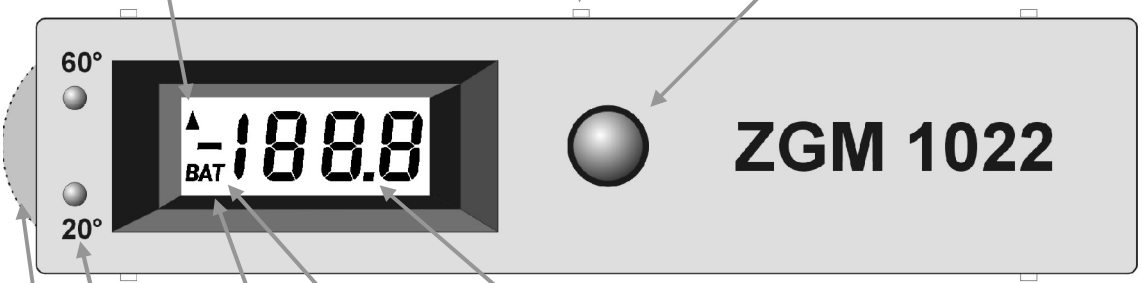
Zehntner GmbH Testing Instruments refuses all warranty and liability claims for damages caused by usage of the ZGM 1022 in combination with **non-original accessories**, or accessories from 3rd party supplier

4. Outline of the instrument, operating elements

Memory sign
Appears when the measurement is completed.

Bolt
For placing the measuring head on the standards.

Button
Press quickly, measuring period 2 sec., result is memorized on the display.



Decimal point

BAT
Flashing of BAT shows, that the accumulator has to be recharged.

- Sign
Has to be watched when calibrating to Zero 00.

LED
indication of measuring angle

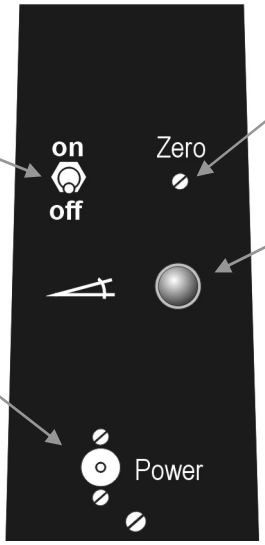
Calibrate
For calibration of the measuring head.

Operating switch ON/OFF

Potentiometer screw
For Zero 00 adjustment.

Angle change-over

Power plug
For charging the accumulator by the battery charger.



5. Putting into operation and calibration

Because of the built-in accumulator the ZGM 1022 is ready for work immediately after switching on the instrument.

Calibration
Different standards are available for the calibration of the measuring head.

a. Zero 00 (gloss trap)
b. Working standard gloss
   for calibration of the measuring device
c. Optional intermediate standard
   for checking the linearity

Proceedings

- **Zero 00 adjustment**
  Place the instrument on the Zero 00 standard, operate the button and adjust to 00 by means of the screw on the right side-wall of the instrument.
- **Calibrate**
  Place the instrument on the working standard gloss. This black calibration standard must be absolutely clean. Adjust the value that is mentioned on the standard by means of the potentiometer „Calibrate“.

The measuring head is placed on the individual standards always in the same direction. This is guaranteed by a bolt on the back of the measuring head.

6. Calibration standards

- Handle the reference standards with care.
- It is important to preserve them from dust and scratches.
- To make sure an exact calibration, only use original Zehntner standards which have been defined by an official controlled primary standard.
- We recommend that you have the standards checked or replaced regularly (every two years) by the producer, since the gloss values of the standards may alter during the time because of environmental factors despite of handling them with care.

Cleaning of the standards

- **Zero 00**
  It is cleaned best by means of compressed air (removes dust and fibres).
- **Calibration standard**
  The surface of the calibration standard is very delicate.

- Only use a new and soft tissue and Zehntner standard cleaner for cleaning it.
- Exact calibrations can only be done by means of perfect and impeccable standards!

7. Measuring procedure

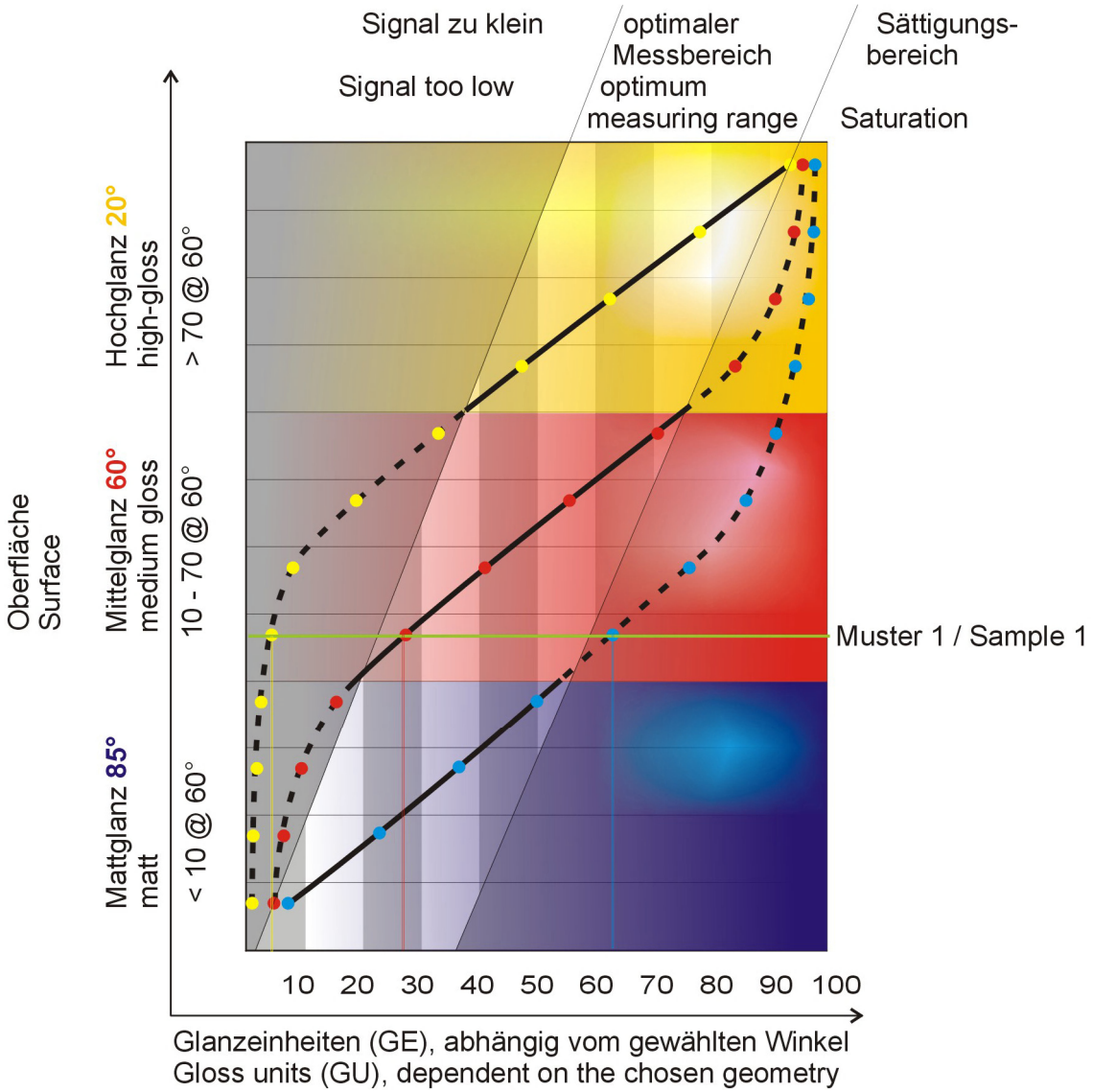
- Switch the instrument on and place it on the test sample.
- Press the button quickly. The display shows the measuring result immediately (in gloss units). The measuring period takes at least 2 sec. or more, if the button is pressed longer.
- The memory sign appears when the measurement is completed. The measuring result is memorized on the display for approx. 1,5 min.; then, the instrument will switch off to preserve the accumulator.

Measuring practice

- Medium gloss surfaces are measured by means of the 60° measuring head. This is the convenient geometry for measuring values of 30 - 70 gloss units (according to ISO 2813) or of 10 - 70 gloss units (according to ASTM D 523).
- Surfaces with a gloss value below 30 gloss units should be measured by means of the 85° measuring head.
- For surfaces with a gloss value above 70 gloss units use the 20° measuring head.
- Metallic surfaces and mirrors etc. with gloss values above 199,9 gloss units are measured by means of the ZGM 1023 series whose measuring range is expandable on 1999 gloss values or with the new generation of gloss series ZGM 1110 and ZGM 1120 with automatic range from 0 to 2’000 GU.

- Generally, impeccable measurements can only be done on clean and unscratched surfaces.

How to choose the correct measuring geometry in the area of paint industry



If you measure the sample 1 (green line) with a measuring angle 60° you will receive approx. 28 GU. In this case the 60° is the correct measuring angle.

If you receive values less than 10 GU, you have to choose a 85° measuring angle.

If you receive values higher than 70 GU, you have to choose a 20° measuring angle.

8. Accumulator

General features

The accumulator consists of a package of 6 cells of 1,2 V - 1,5 Ah each and is situated inside the ZGM 1022.

- Only use Zehntner-accumulators!
- Should the accumulator not operate in the correct way, please contact an authorized Zehntner-representative; do not change the accumulator by yourself.

Charging the accumulator

- A built-in electronic accumulator monitor shows by blinking „Batt“ (on the display) that the accumulator has to be recharged by the battery charger.
- Charge the accumulator by means of the battery charger.
- Connect the battery charger to the measuring head.
- Connect the battery charger to the correct plug (220 V for ACC003 or 115V for ACC081).
- It takes 14 hours to charge the accumulator completely.
- While charging the accumulator, the instrument can be used normally.
  The measuring result will be memorized as long as the battery charger is connected and in operation.

9. Maintenance and storage

Measuring device

- The instrument consists of delicate optical and electronic precision parts. Do not drop it and preserve it from shock, moisture and dust.
- It is best to store the instrument incl. its accessories in the carrying case.
- We recommend having the instrument checked and certified by Zehntner every two years.

Standards of calibration

- For the maintenance of the standards please refer to chapter 6 „Calibration standards” on page 8.

Accumulator

If it is handled with care, it has a long life and needs no special maintenance.

- ***Never*** let the accumulator come into contact with metallic objects which might cause a short circuit.
- ***Never*** throw an accumulator into a fire; it might explode.
- ***Never*** undo the accumulator.

10.Errors

Error: Accumulator blinks or there is no indication on the display, accumulator cannot be charged.

Cause 1: battery charger or cable are defective

Realization:
- If the battery charger is switched onand the mains switch lightened, then the battery charger is o.k.
- If the cable is connected to the measuring head and the ZGM 1022 is working, the battery charger and the cable are o.k.

Cause 2: Accumulator is defective

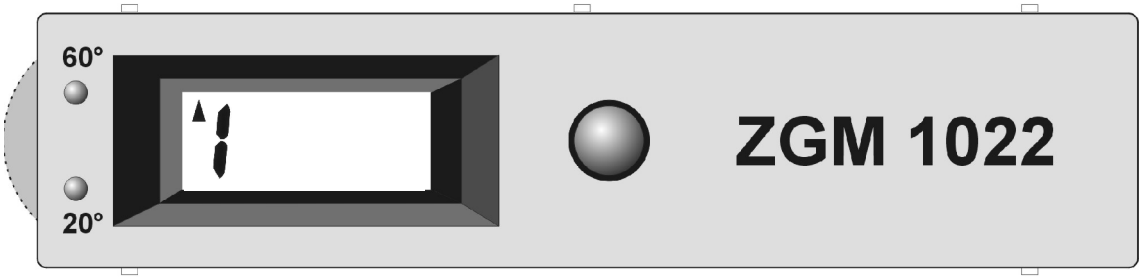
Realization: The ZGM 1022 only works if the battery charger is switched on. Charging the accumulator is not possible.

Remedy: Exchange the accumulator; only use an accumulator by Zehntner!

Error: The ZGM 1022 is not able to display a measuring result.

Cause: The measuring result is higher than the display of the ZGM 1022.

Realization The display is as follows:



Remedy: This error message can not been solved. The measured product has a too big gloss value for this ZGM 1022.
Our ZGM 1023 Zehntner-Glossmeter specially for high gloss surface or or our new generation of glossmeter the ZGM 1110 and ZGM 1120 series with automatic gloss range from 0 to 2'000 GU would be suitable. We would be pleased to measure your samples free of charge in order to recommend you the adequate instrument and geometry.

Error: The ZGM 1022 cannot be calibrated.

Cause: The lamp is defective.

Realization: Press the button while looking through the measuring port. Check if the lamp is working.

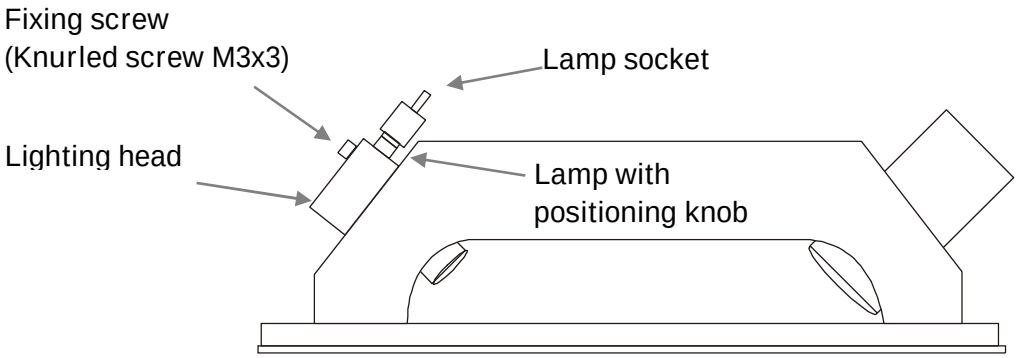
Remedy 1: If the lamp is working, contact the service representative of the Zehntner instruments.

Remedy 2: If the lamp does not work, replace it as follows:

- Switch the Zehntner gloss measuring head off ("off") and unplug the connection cable. Unscrew the four housing screws and take the housing off.

  ⚠ Only qualified person are allowed to open the housing.
- In case of a two angle instrument, first check which of the two lamps does not light (reverse the geometry)
- Release the defective lamp by means of the allan key and remove it from its socket.
- Replace the lamp.
- Clean the lamp with alcohol before inserting it in the lighting head (while doing so, only held the lamp by its socket to avoid finger-prints, etc.) Make sure that the positioning knob of the lamp is inserted exactly into the positioning slit on the lighting head.
- Lightly tighten the lamp with the supplied allan key.

Only the shown knurled screw may be unscrewed when changing the lamp! (see pictures below) Unscrewing of other screws on the optics may cause a change to angle of the lamp.



When changing lamp always make sure the positioning knob is at the right place in the lighting head.

11.Technical specification

11.1 Dimensions

Glossmeter:	192 mm x	53 mm x	110 mm
Battery charger:	95 mm x	50 mm x	135 mm
Accumulator:	14,5 mm x	28 mm x	155 mm
Carrying case:	380 mm x	290 mm x	70 mm

11.2 Weights

ZGM 1020:	1,100 kg
ZGM 1022:	1,100 kg
ZGH 1024:	1,100 kg
Battery charger:	0,500 kg
Accumulator:	0,130 kg
Complete set (measuring device incl. carrying case and accessories)	3,080 kg

11.3 Glossmeter

Geometry:	20° and 60°, 20° and 75°Tappi, 20° and 85°
Measuring port: (for all angles)	40 mm x 15 mm
Measuring accuracy: (in a measuring range of 0 - 100 gloss units)	≤ 1 gloss unit
Lamp:	Tungsten filament lamp 2,5V
Standard illuminant:	A
Detector:	Silicium-photoelement
Spectral evaluation:	V (λ) approximate
Accumulator:	7,2V nickel-metal hydride accumulator (rechargeable)

11.4 Battery charger

Voltage: 230V 50Hz + 10% - 15% 5VA Output voltage: stabilized Fuse: 80mA	*or*	Voltage: 115V 60Hz + 10% - 15% 5VA Output voltage: stabilized Fuse: 125mA