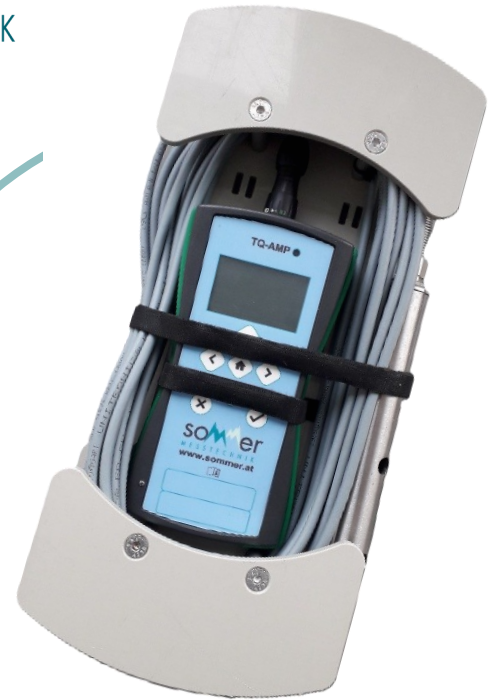


TQ-Tracer V3

Mobile system to measure the discharge
with salt tracer (TQ-S)
or fluorescence tracer (TQ-F)

• Features and Benefits

- Easy and mobile measuring of discharge
- Memory to store measurements
- Display to see values, USB connection to charge
- Reliable results independent of information about the cross section profile
- Ideal application at high velocities, turbulent streams and rivers difficult to access
- Ecologically compatible and harmless to the water
- Realtime visualization of measurement results and amount of discharge
- Comfortable transmission of measurement values from sensor to receiving unit via Bluetooth
- Simultaneous measurements with up to four probes for an instant plausibility check
- Device usable with conductivity or fluorescence probes , e.g. for fluorescein, rhodamine
- Comfortable and compact: whole equipment securely packed into wheeled case



- Measurement Principle

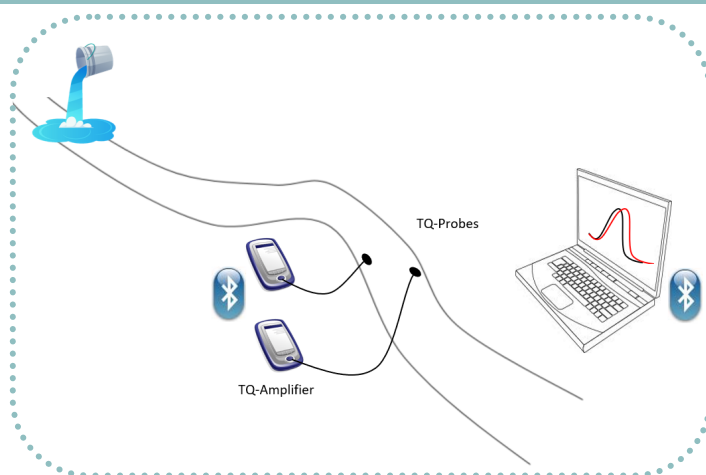
The measurement principle is based on the tracer dilution method. A known amount of tracer material is added to the water in a rapid pulse. The tracer is taken downstream, mixes with the water and forms an elongated cloud.

At a certain point downstream the measuring devices record the tracer concentration in order to calculate the discharge. No further information about the cross section profile of the body of water is needed for this calculation.

- Application

The tracer dilution method is applicable for discharge measurements in all waters where a complete mixing of the tracer takes place. It is especially suitable for fast-flowing, turbulent waters with complex cross-sections.

High turbulences, changing cross sections and rocks on the mixing path, as for example in mountain streams, foster the mixing and therefore have a positive effect on the measurement.



- How the measurement works

A single person can do a measurement in a short time. The **data transmission via Bluetooth** from the receiving device to the notebook allows to remain at a safe and comfortable place. The measurement curves are displayed in real-time and the device calculates continuously the given discharge.

First, the probes have to be calibrated at the site. Simultaneously measurements with up to four probes are possible what provides an immediate plausibility check.

Software: TQ-Commander V3

The software TQ-Commander guides the user comfortably through the entire measuring sequence including the calibration of the probes.

Connection: After pressing the start button the device connects itself via the Bluetooth interface. No further settings are necessary.

Realtime visualization: The measurement curves are displayed on the screen in real-time. Therefore the quality of the results can be evaluated already during the measurement itself.

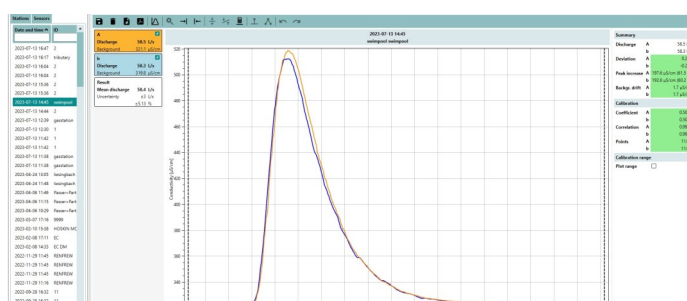
Calibration: The software supports the calibration of the probes to the actual water. All calibration tools are included in the TQ-system as accessories.

Data readout: By software you can read existing measurements from TQ-AMP V3 and upload to PC. Further-

more you can do firmware upgrades though TQ-Commander.

Postprocessing, protocols and data output: The TQ-Commander helps to postprocess measurement results and to edit reports. The data is outputted in the file formats CSV or XML to be imported in individual user programs. TQ-Commander includes an **uncertainty calculation** for every single measurement.

Software-Versions: PC-version for Microsoft Windows (WIN 10 & 11) , Android App



Salt Tracer TQ-S

Salt (NaCl), which can be easily injected and dissolved in water, is used as tracer material.

The used probe are conductivity probes. It has an internal temperature compensation and is linearized according to the norm EN27888 for natural water.

For use in very turbulent rivers and at high flow velocities the probes of the TQ-S can be equipped with a protective and heavy armor.

Probe type	Conductivity probe
Application	Discharges up to 10 m³/s
Typical tracer insertion	Approx. 3-5 kg per m³/s
Advantages	<ul style="list-style-type: none">○ Easy handling○ Little investment costs○ Easy procurement of salt as tracer



TQ-S Standard with handy cable-spool and probe



TQ-S Heavy Duty Version: with handy cable-spool and probe



Conductivity probe of the TQ-S

Fluorescence Tracer TQ-F

A main advantage of using fluorescence tracers is the small minimum concentration required for detection. Therefore, only a very small amount of tracer material needs to be added to the water and yet measuring of considerable volumes of discharge is possible.

The TQ-F (contrary to salt tracers) can be applied for measuring sewage too.

By default the tracer units for fluorescence measurements are equipped with Uranin probes. However, upon request alternative optical sensors, e.g. for Rhodamine WT, are also available.

For increased stability and secure application the probes of the TQ-F are equipped with a protective and heavy armor.



Fluorescence probe of the TQ-F

Probe type	Optical fluorescence probe
Application	All discharges
Typical tracer insertion	Approx. 1g per m³/s
Advantages	<ul style="list-style-type: none">○ Little amount of tracer needed○ Low detection limit○ Measuring sewage is possible



TQ-F Standard with handy cable-spool and probe

*) Inserting substances in the water might eventually require a permission by local authorities



	Tracer System TQ-S	Tracer System TQ-F
GENERAL		
Measurement principle	Tracer dilution method with instantaneous feed	
Application	Discharges up to 10 m³/s	All discharge volumes
TQ-AMP (Measurement device with Bluetooth-transmission)		
Memory capacity , Display	8MB internal Memory, 128 x 64 Pixel	
Transmission interval	1 second	
Data transfer	Bluetooth class 1 (transmission range up to 100 m)	
Working temperature	-20 ... +60 °C	
Protection	IP66	
Energy supply	4x 1.5 V batteries, size AA or 4x 1.5 V, 2500 mAh NiMH battery, size AA	
Battery capacity (with 4x 2500 mAh battery)	40 hrs	25 hrs
Charging time	approx. 10 hrs	
PROBES		
Probe type	Conductivity probe	Fluorescence probe
Measurement range	1µS/cm...2 S/cm	Fluorescein/Rhodamine WT: 0 ... 50 µg/l (ppb)
Resolution	0.0001 µS/cm	0.005 µg/l (ppb)
Working temperature	0 ... +60 °C	0 ... +50 °C
Other features	<ul style="list-style-type: none">○ Integrated temperature compensa- tion○ Measurement linearization acc. to: EN 27888:1993 for natural water	<ul style="list-style-type: none">○ Further types of probes for different tracer substances available upon re- quest
ACCESSORIES INCLUDED		
Pipette	500 µl Pipette	
Jars	<ul style="list-style-type: none">○ Bottle for calibration solution○ Measuring cup 600 ml○ Measuring cup 500 ml○ Volumetric flask 500 ml	<ul style="list-style-type: none">○ Bottle for calibration solution○ Measuring cup 750ml, stainless steel○ Measuring cup 500 ml○ Volumetric flask 500 ml
Others	<ul style="list-style-type: none">○ USB memory stick (documentation + software)○ USB Bluetooth adapter	
TQ-COMMANDER (Software)		
PC-Version	Windows 10, 11	