The New Turb 430 T according to US EPA

Turb 430 T is the new portable turbidimeter with tungsten lamp for the measuring range from 0 – 1100 NTU according to US EPA 180.1. It covers the measurement range from 0-1100 NTU and thus is the complementary instrument to Turb 430 IR with infrared light source acc. DIN EN 27027/ ISO. The instrument has been designed for the use at changing locations from water analysis to process control. It is smart, robust and waterproof by fulfillling IP67. Application areas are:

- Water Analysis (drinking water, ground and surface water, waste water)
- Environmental monitoring
- Process control
- Beverage industry incl. wine industry

1. Portable Turbidimeter with Lab Quality Needed?

By storing 1000 measurement values, an adjustable calibration interval and a calibration documentation via RS 232 interface, the new Turb 430 T as well as Turb 430 IR offer functions and benefits which usually are reserved for laboratory instruments! In the twinkling of an eye the optional LabStation changes the portable meter into a smart benchtop instrument with an excellent data management by the supplied software package LSdata.

Because of the concerted development with the multitalented pHotoFlex Series, the Turb 430 models present a lot of innovations in comparison with conventional instruments:

- Robust und handy with innovative optics to minimize stray light influences
- Precise measurements also in critical range below 1NTU
- Adjustable calibration interval

- Output of a calibration protocol
- Backlit graphic display
- Data storage for 1000 values with date, time and ident number
- RS 232 interface, USB optional via Adapter
- GLP compliant data export with date, time and ident number including optional user identification
- LabStation (optional) for laboratory applications up to 1100 NTU

2. Up and Away: The Portable Lab in a Field Case

For those who are in the field measuring at different sampling locations, the new sets of Turb 430 T und Turb 430 IR offer a small laboratory for the road! Particularly user friendly is the integrated „bench“ with appliances for the instrument, cuvettes, beaker and standards. Additionally:

- Calibration Kit
- Useful accessories: emtpy cuvettes, PC connecting cable AK Labor 540 B, cleaning tissues, screw driver
- Storage

3. New Optical Design

Just like Turb 430 IR, the Turb 430 T with tungsten lamp excels by a novel optical design of a “light trap”. The influence of stray light is so much minimized, that even in the critical range below 1 NTU/FNU very precise measurement values can be obtained. This accuracy can even be enhanced by purposeful handling of the calibration (see application notes). A respective instruction for measurements below 1 NTU/FNU has been incorporated in the manual. Turb 430 T is thus optimal for measurement in drinking water, wherever US EPA requirements must be fulfilled.

Turb 430 models fulfill the requirements for stray light of the Pharmacopoeia 5.0.

4. Calibration: Precise and Nonhazardous

Calibration takes place automatically via user guidance on display. The calibration interval can be set and a calibration protocol can be exported via RS 232.

For the automatic 3-point calibration, a set of AMCO Clear® Standards (0.02-10-1000 NTU) is supplied with the instrument. The stanards are retraceable to formazine and accepted according to US EPA as primary standards, respectively secondary standards acc. to DIN ISO. Facing formazine, AMCO Clear® Standards show substantial advantages:

- **Higher Accuracy and High reproducibility**
  because of the superior and stable dispersion of particles in the solution and the higher reproducibility in the production of the standards. When producing and diluting formazine standards, tolerances from ±5-7% between different lots can occur, not mentioning the variation of raw material amongst different suppliers.

- **12 month shelf life**
  Formazine must be use freshly prepared, because the particle size and composition is subject of change within shortest period of time: They clog and settle incalculable. False calibration is resulting and –therefore - also the measuring results will be erratic. Studies with AMCO Clear® Standards have shown a stablity for at least 12 month.

- **Ready to use standards in the required concentrations**

- **Harmless in respect of health and easy to dispose**
  Raw materials of formazine are hazardous! AMCO Clear® Standards are nonhazardous and harmless. They can be simply disposed.

Accuracy in the measuring range below 1 NTU can be enhanced by following the application notes for drinking water.

5. Application Notes for Drinking Water and Measurements below 1 NTU

Additionally to the high precision of the instrument, the accuracy can be enhanced by excluding the influences of cuvettes!

Measuring in the low range < 1 NTU, tolerances within the cuvette influence the reproducability and accuracy of the measurement. Therefore, a specific procedure is recommended:

The calibration with standards 1000 NTU and 10 NTU can be done in unscratched and clean cuvettes by simply following instructions. Here, the influence of cuvettes are marginal. While calibrating with the 0.02 NTU standard the orientation of the cuvette during calibration measurement should be marked. For low value measurements of samples, the same cuvette should be taken, aligned according to this marking. In this way, glass tolerances are practically excluded, measurement values more precise! Another way commonly known is the use of silicon oil to compensate influences of scratches etc. However, a optical device should be kept “as clean as” possible and by turning and marking cuvette, oil can be avoided.

6. Which Model for Which Application?

Especially in turbidity measurement, the requirements and applications are manifold. Whoever needs to fulfill national regulations according to Standard Associations, will choose the instrument accordingly:

Turb 430 T: acc. US EPA 180.1
Turb 430 IR: acc. DIN EN 27027 / ISO 7027

Whoever wants to measure independently from regulations, e.g. in process control or monitoring, can establish other criteria for choice:

To measure turbidity in clear and uncolored solutions with small particles, Turb 430 T with wolfram lamp is a good choice. Due to the minor scattering of small particles the particle detection is superior to an infrared light source. This means a higher sensitivity in comparison to the Turb 430 IR model.

In colored solutions, an infrared light source is preferably, as practically no absorption is taking place in this range of 860 nm. Measurement results thus will not be falsified by color effects. Turb 430 IR is here the appropriate instrument.

7. Smart Data Management: LabStation with LSdata

In combination with LabStation, Turb 430 models are ideal for laboratory tasks offering comfortable instrument handling with mains supply. In this combination they provide the comprehensive and comfortable functionality of a laboratory instrument with data storage, calibration functions and an interface for data export to PC.

The new software package LSdata coming with the LabStation allows a smart data mangement. All measurement values taken onsite can be sent to PC in a GLP compliant way, including user identification. From here, an export directly into Excel is possible.

In addition. the LabStation is working as battery-charging station of the supplied rechargeable battery set.

8. Technical Data for Turb 430 T

Measuring principle	Nephelometric (90° Stray light)
Light source	Tungsten
Measuring Range	0-1100 NTU
Resolution	0,01 for range 0,00 -9,99 0,1 for range 10 – 99,90 1 for range 100 - 1100
Accuracy	0.01 NTU or 2% of measurement value
Reproducibility	< 0.5% or 0,01 NTU
Calibration	Automatic 3-point calibration
Response Time	Ca. 7 s
Cuvette	28 x 60 mm, 20 ml Sample Volume
Display	Backlit graphic display
Data Storage	1000 values with date, time, ident number
Interface	RS 232, USB via adapter (optional)
Operating Temp.	0... +50°C
Power Supply	4 Mignon (AA) for approx. 3000 measurements
Protection against Water	IP67
Approval	cETLus, CE, FCC;
Warranty	2 years

9. Order Information

Turb 430 T
Single instrument, battery model with 4 x 1,5 V, Type AA, manual and waterproof quick guide, CD with enhanced manual, 5 empty cuvettes 28 mm, cleaning tissue, sticker for marking of cuvette.

Optional Accessories

For all Turb 430 models there is a rechargeable battery set including universal power plug. Alternatively, with **LabStation** including the rechargeable battery set it can be upgraded to a small benchtop instrument with comfortable data management on PC via Lsdata softwarepackage.

Rechargeable batteries: RB Flex/430
Battery Set **(**NiMH), incl. universal power plug with Euro, US, UK and Australien plugs

LabStation LS Flex/430:
incl. rechargeable battery set and LSdata software package.

Model	Description	order number
Turb 430 T	Portable Turbidimeter 0-1100 NTU acc. US EPA	600 325
Turb 430 T / SET	Portable Turbidimeter Turb 430 T in field case acc. to US EPA	600 326
Turb 430 IR /SET	Portable Turbiditymeter Turb 430 T in field case acc. to DIN ISO	600 321
KalKit Turb 430 T	Kal Kit Set AMCO Clear® (0.02-10-1000 NTU)	600 561
RB Flex/430	Rechargeable batteries+universal power plug for all models pHotoFlex / Turb 430	251 300
LS Flex/430	LabStation for all models pHotoFlex / Turb 430 incl. rechargeable battery and LSdata software package	251 301
FC pHotoFlex/Turb 430	Field case (empty) for all pHotoFlex and Turb 430 models	251 304
LK 28 Set *	3 empty cuvettes for all models pHotoFlex / Turb 430	251 302

*larger bundles on request

10. More than Turbidity? Water Analysis with the multitalent pHotoFlex Turb!

For those, who need more than just turbidity measurement – e.g. for environmental monitoring – the „all in one instrument“ **pHotoFlex Turb** is suitable. It is another member of this new generation of field instruments for the measurement of turbidity, photometric parameters and pH. pHotoFlex Turb offers 6 wavelengths and more than 150 programmed methods.

More information about the new portable instruments:
Laboratory Catalog 2006, www.wtw.de, Analytica April 2006 in Munich, Germany, ACHEMA May 2006 in Frankfurt, Germany.