

# DT9011

## Haze Control Laboratory Turbidimeter



- Precision forward ( $11^\circ$ ) and side ( $90^\circ$ ) scatter measurements
- In-bottle measurement - no degassing or sample preparation required
- Drift-Free Factory Zero Point
- Internal data logger
- Circulating Water Bath
- Programmable units of measure - FTU, NTU, EBC or user-defined
- RS232 data transfer

The optek DT9011 is a precision, laboratory-quality turbidimeter. The DT9011 features an advanced, triple beam scattered light optical design, measuring forward scatter ( $11^\circ$ ), side scatter ( $90^\circ$ ), and direct ( $0^\circ$ ) light.

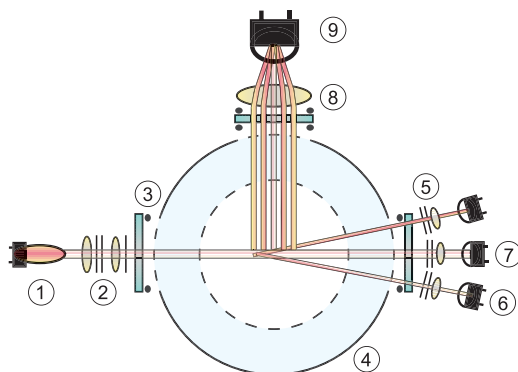
The DT9011 effectively measures a broad range of constituents that contribute to turbidity and fine haze in consumer products like beer and other beverages.

The sample is submerged in a water bath and sampled 250 times during one rotation, followed by advanced data analysis. This eliminates the effects of bottle color and shape, as well as scratches, seams and other imperfections in the sample bottle.

The circulating water bath and drift-free, factory zero point assures incredible sensitivity and precision.

The powerful, easy-to-use DT9011 software allows you to store product parameters, ranges and measuring ranges, bottle types and more, for up to 32 different products.

The integral data logger records all measurements and parameters. The data logger can store up to 25,000 data sets. The data tables can be displayed directly on the DT9011 or transferred to a PC using the optional PC-Transfer Software.



### Type DT9011

- 1 VIS/NIR Lamp
- 2 Primary optics module with spectral filter
- 3 Sample chamber window
- 4 Sample chamber with bath turntable
- 5 Forward scattered light optics
- 6  $11^\circ$  Forward scatter photodiodes
- 7 Direct beam photodiode
- 8 Side scatter optics
- 9  $90^\circ$  Side scatter photodiode

# Technical Data

## DT9011



### Housing:

Table case (front IP 40)  
381 x 394 x 445 x mm (15" x 15,5" x 17,5") (W x H x D)

### Materials:

Housing: Stainless steel 1.4301 (SS304)  
Measurement chamber: POM C  
Windows: Borosilicate glass  
Gaskets: Buna, Viton  
Tubing: PA, PVC  
Fittings: Stainless steel, brass

### Water bath:

Overflow  
Drain valve (flow regulation)  
Sensor for minimum water level  
Volume: 600 ml (20 fl oz)  
Flow: 5 to 15 l/h with circulation  
Temperature: +10 °C to +40 °C

### Air purge:

System with drying agent (silica gel)

### Rotations system:

Standard

### Display:

LCD-graphic display (240 x 128 pixel), LED-background illuminated  
1 LED (green): power on  
2 LED (yellow): alarm I, II  
1 LED (red-flashing): system failure / lamp failure

### System clock:

Accuracy approx. 1 minute / month

### Battery life:

approx. 15 years

### Operation:

18 push buttons keyboard

### Power supply:

115/230 V AC, selectable  
(93,5 – 132 / 187 – 264 V AC, 47 – 64 Hz)

### Power consumption:

50 VA max.

### Ambient conditions:

operation: 0 °C (+32 °F) to +40 °C (+104 °F), no direct light  
transportation: -20 °C (-4 °F) to +70 °C (+158 °F)

### Measuring range:

Bottles: 0-1 to 25 EBC (11° und 90°)  
0-4 to 100 FTU (11°)  
0-4 to 100 FTU / NTU (90°)

cuvettes: 0-1 to 100 EBC (11° und 90°)  
0-4 to 400 FTU (11°)  
0-4 to 400FTU / NTU (90°)

### Units:

User defined in software

### Calibration (11° and 90°):

Factory calibration  
User calibration possible, to Factory calibration at any time reversible  
Comparison between factory settings and user settings possible

### Resolution:

0-1 EBC or 0-4 FTU: < ± 1 % of respective measuring range  
0-100 EBC or 0-400 FTU: < ± 0.05 % of respective measuring range

### Repeatability:

< ± 1.0 % in cuvette

### Linearity:

< ± 1.0 % in cuvette

### Light source:

halogen lamp: 5.0 V DC, 0.97 A, typical lamp life 1.5 to 3 years

### Detector:

Three detector circuits with hermetically sealed silicon photodiodes

### Wave lengths:

590 – 1100 nm

### Cuvettes:

diameter: Ø 58.0 mm to Ø 72.5 mm / Ø 2.28" to Ø 2.85"  
wall thickness: minimum 2 mm  
height: 140 mm to 280 mm / 5.5" to 11.0"

### Bottles:

diameter: Ø 58.0 mm to Ø 72.5 mm / Ø 2.28" to Ø 2.85"  
height: 140 mm to 280 mm / 5.5" to 11.0"  
color: Green, brown, clear

### Bottle insert:

Adapter Ø 61: Bottles Ø 58.0 mm to Ø 60.5 mm / Ø 2.28" to Ø 2.38"  
Adapter Ø 64: Bottles Ø 60.5 mm to Ø 63.5 mm / Ø 2.38" to Ø 2.50"  
Adapter Ø 67: Bottles Ø 63.5 mm to Ø 66.5 mm / Ø 2.50" to Ø 2.62"  
Adapter Ø 70: Bottles Ø 66.5 mm to Ø 69.5 mm / Ø 2.62" to Ø 2.74"  
Without adapter:  
Bottles from Ø 69.5 mm to Ø 72.5 mm / Ø 2.74" to Ø 2.85"

## Accessories

### Accessories Included:

• Set of Bottle Adapters:  
Adapter sizes: Ø 58.0 to 60.5 mm,  
Ø 60.5 to 63.5 mm, 63.5 to 66.5 mm,  
Ø 66.5 to 69.5 mm. Also includes Bottle  
Positioner/Light Trap

- Measuring Chamber Cover:  
Protects sample from extraneous light
- Set of Round Optical Cuvettes (2 pcs.):  
Dimensions: Ø 60 x 2 x 190 mm

### Optional Accessories:

- PC-Transfer Software
- Software DT9011 PC-Transfer  
and manuals on CD-ROM
- Software DT9011 DR Monitor