

# Laboratory Spectrophotometer ERX30

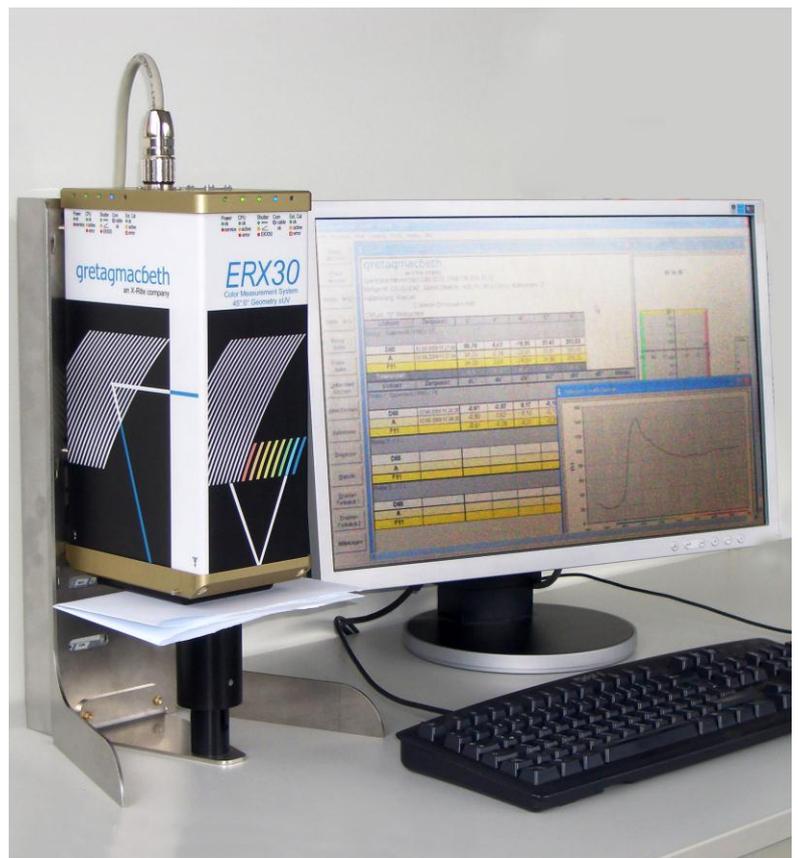
**Spectral color measurement in the laboratory with 45°circular:0° geometry (CIE Standard), with and without excitation of optical brighteners**

## Advantages of Color Measurement

- ✓ Good correlation with average visual color difference perception (45°:0° geometry)
- ✓ Objective figures, no guess work
- ✓ Documentation of the production (ISO 9000)

## Special advantages ERX30

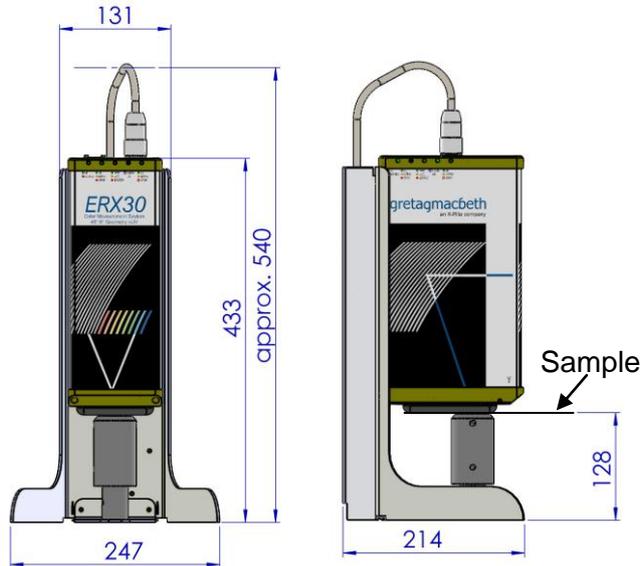
- ✓ Latest in electronics and technology
- ✓ Good reproducibility
- ✓ Excellent measurement results with real spectral resolution of 1 nm.
- ✓ Measurement of optical brightener
- ✓ Opacity measurement included
- ✓ Same measurement geometry 45°:0° as in printing industry
- ✓ Excellent long-term stability
- ✓ External calibration only every 4 weeks necessary
- ✓ Automatic calibration of UV content
- ✓ Same software as user interface in In-Line measurement
- ✓ Automatic link between In-Line and laboratory measurement



## Functional description ERX30

The ERX30 is a compact spectrophotometer with the standardized geometry 45°circular:0°.

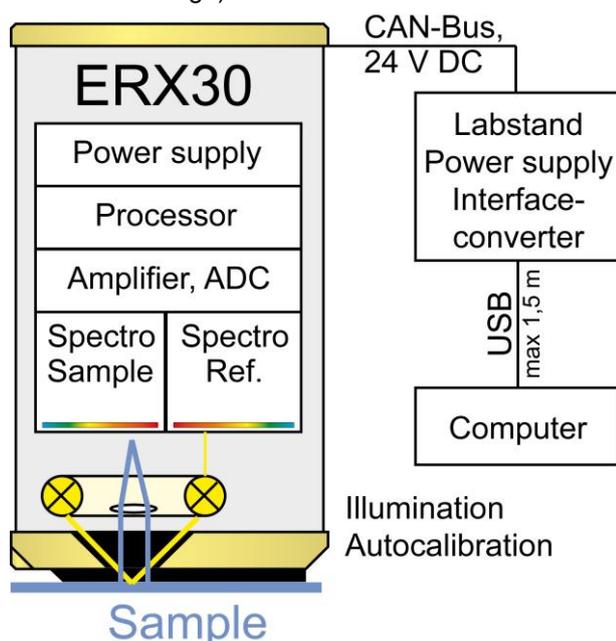
The sample is measured from the bottom with direct contact to the instrument (picture 1).



Picture 1 Measurements

For a measurement the sample will be illuminated by white light (Xenon flash lamp, daylight) and light without UV component under 45°circular for approx. 1 / 1000 sec. Vertical to the sample's surface (under 0°) the reflected light will be collected and guided to a high resolution spectrometer (picture 2).

Simultaneously with the sample measurement a reference measurement of the lamp will be taken with a second high resolution spectrometer (full dual beam design).



Picture 2: Function blocks in the ERX30

In both spectrometers the optical measurement signals will be separated into 401 different wavelength signals via corrected holographic concave gratings and measured via 401 photoelectrical sensors. The result is a true 1 nm spectral measurement resolution.

The measurement signals will be amplified and digitised with high resolution. A fast processor calculates corrected spectral reflectance data.

These 401 reflectance results (from 330 nm to 730 nm) are the basis for all further colorimetric calculations for any possible illuminant and observer (e.g. CIE Lab data for illuminant D65 / 10° observer or illuminant C / 2° observer or others).

The automatic internal calibration of the system also includes automatic wavelength calibration for excellent measurement accuracy and long-term stability. The calibration can be verified by measuring a known, colored sample. Calibration of the UV part of the lamp will be checked via a brightened white standard. This guarantees high and reproducible measurement accuracy and stability.

Control over the color measurement system ERX30 is done via USB interface by a computer (PC); the measurement data will be transmitted to the computer.

### Typical Applications

The spectrophotometer ERX30 is well suited for all applications where precise measurements with excellent long-term stability are requested. The measurements have an excellent correlation with the visual assessments because of the 45°/ 0° geometry, which is standard in the printing industry. This guarantees an excellent color communication between paper manufacturers and their customers. The ERX30 is the ideal complement in the laboratory to the ERX50 In-Line system.

### References

The spectrophotometer family ERX is successfully working for the measurement of:

- ✓ Coated and uncoated paper
- ✓ Paper with optical brightener (FWA)
- ✓ Laminate paper
- ✓ Paper board
- ✓ Paper board with white top layer
- ✓ Tissue
- ✓ Pulp with and without optical brightener
- ✓ Plastic foils
- ✓ Textiles
- ✓ Fibres

## Special advantages of the ERX30

- ◆ **Precise spectral color measurement**
  - ✓ Also critical colors and demanding applications can be measured with high quality based on the excellent spectral resolution of 1 nm.
  - ✓ The wide spectral range of the ERX30 from 330 nm to 730 nm gives excellent information.
  - ✓ The sample illumination has adjustable UV and non-UV settings for base white and optical brightener.
  - ✓ Good correlation with In-Line measurements.
  - ✓ Good correlation with the human vision.
- ◆ **Excellent short and long term stability**
  - ✓ Precise color measurement because of automatic internal calibration.
  - ✓ Absolute automatic wavelength calibration with highest precision (0.07 nm). Therefore very good long-term stability and precision.
- ◆ **Easy to use**
  - ✓ A handy sample holder fixes the paper at the measurement aperture
  - ✓ Easy opacity measurement over black and infinite layer
  - ✓ The unit is robust, and has long lifetime.
  - ✓ The long-life Xenon flash lamp (1 year warranty), typically lasts several years and is a low-price item.
- ◆ **Our ER product family has been successfully measuring in hundreds of installations since 1987**
  - ✓ By continued development and improvements our customers have a proven system with the latest technology.
  - ✓ The current model is the fourth generation and has further improved technical data.
  - ✓ Development and production of the ERX spectrophotometer family in Germany.
  - ✓ Installations worldwide.

## Turnkey color measurement system

The spectrophotometer ERX30 is typically sold as turnkey system directly from the manufacturer, with software and computer.

Support and service are available around the world.

At GretagMacbeth you find the experienced experts and proven partners for your color measurement in the laboratory, at the production machine and Closed Loop Color Control!

### ◆ **In-Line spectrophotometer ERX family**

#### ◆ **Instruments**

- ✓ ERX30 for laboratory measurement
- ✓ ERX40 for In-Line pulp measurement
- ✓ ERX50 for In-Line measurement of the paper web

#### ◆ **Software**

- ✓ Quality control
- ✓ Link between In-Line and laboratory
- ✓ Opacity and stack measurement
- ✓ Automatic Closed Loop Color Control
- ✓ Link to other information systems

#### ◆ **Measurement frame (customized)**

- ✓ Measurement on the web
- ✓ Measurement in wet stock

#### ◆ **Dye dosing station**

- ✓ For continuous control of dye addition
- ✓ For Automatic Closed Loop Color Control



The GretagMacbeth group supplies:

- ✓ **Color data products (portable, benchtop, In-Line)**
- ✓ **Software for quality control, color matching and Closed Loop Color Control**
- ✓ **Light booths for visual inspection**
- ✓ **Densitometers, color management systems**

# Technical Data ERX30 and Laboratory Stand

## Color sensor ERX30

Measurement in the laboratory; not sensitive to ambient light; automatic internal calibration and measurement; standardized measurement geometry 45°: 0°; robust construction; high accuracy and precision; built-in diagnostics with service memory (remote diagnostic).

Illumination	45° circular
Flash lamp 1	D65 approximated, UV adjustable
Flash lamp 2	no UV, wavelength limit typ. 420 nm
Measurement	0°
Spectral measurement area with UV	330 nm ... 730 nm
Spectral resolution (optical !)	1 nm
Absolute wavelength accuracy with internal automatic control	better than 0,1 nm
Dual beam (sample and reference channel)	simultaneous
Measurement time	20 ms
Measurement area	12 mm diameter
Measurement distance	0 mm, sample has to touch the instrument
Measurement interval	3 sec min.
Reproducibility CIELAB (standard deviation for repeated difference measurements of the white standard)	$\Delta L^*, \Delta a^*, \Delta b^* \leq 0.03$
Interinstrument agreement between ERX50 systems Based on a white tile	$\Delta L^*, \Delta a^*, \Delta b^* \leq 0.1$
Average color difference for measurement of the 12 BCRA standards from production average	$\Delta E^* < 0,3$
Size	approx. 170 x 110 x 295 mm <sup>3</sup>
Weight	approx. 5 kg CE Mark
Calibration (traceable to PTB)	instrument specific white standard
Spectral data directly from the measm. head (330nm - 730nm) More data will be available via the computer (see evaluation programs ESWin)	measured in steps of 1 nm
Ambient temperature:	max. 40°C

## Laboratory stand with power supply and interface converter

Input Voltage	115V/230V AC, +25% / -15%, 45-440 Hz
Power consumption	max. 100 VA, typ. 10 VA
USB interface to computer	USB 2.0, typ. 1.5 m, max. 3 m cable
Pressure of sample holder to aperture	ca. 4 N
Black background reflection	<<0.5%
Size approx.	265 x 265 x 135 mm <sup>3</sup>
Weight including ERX30	approx. 8.5 kg CE Mark



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Quality Management

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