Advanced Photoconducting Drum Test System

PDT®-1000

The PDT-1000 is a computer-controlled, multifunction test system designed for evaluating photoreceptors used in electrophotographic printers and copiers. This flexible system accommodates a wide range of drum types and sizes and performs many types of tests including surface mapping, electrophotographic characterization, and coating uniformity measurement.

Overview

A standard PDT-1000 system consists of a computer-controlled light-tight scanner, two electrostatic voltmeters and probes, a tungsten-halogen light source, a light meter, and a bank of erase LEDs. The control software runs on a PC with Microsoft Windows XP or Vista operating system and a minimum of two USB2.0 ports. The software performs all the data analysis, display, and file handling functions and can readily be customized. The scanner accommodates drums up to 180 mm in diameter and 400 mm in length. The corona charging device uses negative charging with positive charging as an option. The computer-controlled light source is equipped with user-specified bandpass filters for wavelength selection.

The PDT-1000 test functions are software-controlled. The software is easy to use yet flexible enough to allow quick reconfigurations of all the test parameters through a logical, user-friendly interface. In a typical session, the operator loads a drum into the scanner and initiates a user-prescribed scan with a single mouse-click. The system performs the scan, saves the scan data, and reports the results. Scan data can be archived, accumulated over time, reviewed, printed, or exported to other software for further analysis.

Built-in Test Functions

- Charge acceptance scans
- Photo-discharge scans
- Dark decay measurement
- Cyclic fatigue tests
- Photo-induced discharge curve (PIDC)
- Charge and discharge uniformity mapping
- Defect mapping

Typical Applications

- Materials research and development
- Photoreceptor development
- Process development, control, and optimization
  - Coating uniformity characterization
  - Pigment dispersion characterization
- Production quality control

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System Specifications*

PDT®-1000

Test Functions

Electrophotographic characterization

- Charge acceptance
- Photo-discharge
- Dark decay
- Photo-induced discharge curve (PIDC)
- Cyclic fatigue performance

Defect mapping

- Charge and discharge uniformity
- Defects in coating
- Contamination

Cycle Time

Cycle time for full-body map: Depends on drum length, rotational speed, and pitch; for 360 mm long drum @ 2.0 rev/sec and 1 mm/rev, cycle time is <5 minutes

System Hardware

- Light-tight enclosure with safety interlocks
- Instrument ring with adjustable instrument holders
- Drum loading and alignment mechanism
- Instrumentation; data acquisition and control hardware
- All necessary interface electronics, cables, and connectors

Drum Charging

- Corona charging system
- System uses negative or positive charging
- Drum voltage adjustable up to 1 kV

Exposure Light Source

- Tungsten halogen light source
- One interference filter (typically 780 nm) and one neutral density filter (typically 10%) supplied with system; others available as options
- Interference filters between 400 and 1000 nm (approximate 50 nm intervals) optional
- Exposure on/off controlled by an electromechanical shutter; minimum pulse duration less than 0.1 second
- Computer-controlled aperture for setting exposure intensity; maximum exposure energy approximately 2μJ/cm^2 at 780 nm wavelength and 400mm/s scan speed
- Light meter provided to monitor exposure intensity on-line

Erasure Light Source

- Erasure light source is a bank of red LEDs; maximum erasure energy typically 25μJ/cm^2

Voltage and Current Measurement

- System is equipped with two non-contact electrostatic probes for monitoring drum voltage
- Charging current measurement is built in

Motion Control

- Rotation speed 0.2 to 5.0 rev/s (typical)
- Variable pitch 0.2 to 2.0 mm/rev (typical)

Drum Dimensions

- Maximum drum length 400 mm
- Maximum drum diameter 180 mm
- Minimum drum diameter 30 mm
- Drum adapter size TBD with customer

Control Software

Control software provides all measurement, data acquisition, and data analysis functions, including basic statistical functions (minimum, maximum, and mean voltages and standard deviation)

Computer Configuration (customer-supplied)

- PC with Windows XP or Vista operating system
- Minimum of two USB2.0 ports
- Microsoft Excel (recommended but optional)

Electrical Requirements

110 VAC±10% @ 50/60 Hz or 230 VAC±10% @ 50 Hz

Maintenance and Operating Environment

Requires good maintenance practices typical for laboratory equipment

- Temperature
  - Operating: 10º to 32º C (50º to 90º F)
  - Storage: 0º to 35º C (32º to 95º F)
- Relative humidity
  - Operating: 20% to 80%
  - Storage: 10% to 95% (non-condensing)

Dimensions and Shipping Weight

- Main unit: 46 cm x 66 cm x 89 cm (18" x 26" x 35")
- Instrumentation: Standard 48 cm (19") rack mount dimensions
- Packaged dimensions: 114 cm x 86 cm x 122 cm (45" x 34" x 48")
- Approximate shipping weight: 204 kg (450 lb)

Documentation

- User's guide