Advanced Photoconducting Drum Test System

PDT®-1000

The PDT-1000 is a computer-controlled multifunction test system 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, coating uniformity measurement, and substrate cleanliness evaluation.

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. A user-supplied computer runs the Microsoft Windows®-based control software and houses the data acquisition and control hardware. The software performs all the data analysis, display, and file handling functions and can readily be customized. The scanner accommodates drums up to 200 mm in diameter and 400 mm in length. The corona charging device supports both positive and negative charging. The computer-controlled light source is equipped with user-specified bandpass filters for wavelength selection. Custom configurations are also available.

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 simple, logical user interface. In a typical session, the operator loads a drum into the scanner and initiates a user-specified 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
- Xerographic time-of-flight (option)
- Capacitance (option)

Typical Applications

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

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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
- Xerographic time-of-flight (option)
- Capacitance (option)

Defect mapping
- Charge and discharge uniformity
- Coating defects
- Contamination

Cycle Time

- Cycle time for full-body map: Depends on drum length, rotational speed, and pitch; for 360 mm long drum @ 2 rev/sec and 1 mm/rev, cycle time is 13 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 allows both positive and negative charging
- Drum voltage adjustable up to 1 kV (typical)

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) available as options
- 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 10μJ/cm^2 at 780 nm wavelength
- Light meter provided to monitor exposure intensity on-line
- Xenon flash or LED exposure source (options)

Erasure Light Source
- Erasure light source is a bank of red LEDs; fluorescent erase lamp or LEDs with other wavelengths available as options
- Maximum erasure intensity 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
- Other configurations, including transparent probe, available as options

Motion Control
- Rotation speed 0.2 to 5.0 revolutions per second (typical)
- Variable pitch 0.2 to 2.0 mm per revolution (typical)

Drum Dimensions

- Maximum drum length 400 mm
- Maximum drum diameter 200 mm
- Minimum drum diameter 30 mm
- Geared and gearless drums can be tested; optional adapters for both types are available

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)

- Pentium PC
- Two ISA slots for interface cards
- Two free slots for connector brackets (adjacent to ISA slots)
- Microsoft Windows® 95 or 98
- Microsoft Excel® 7.0 or higher

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: 10° to 32° C (50° to 90° F)

  Storage: 0° to 35° C (32° to 95° 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

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