

DESCRIPTION

The P4400 Thermo Scientific Genesys 30 Spectrophotometer (G30) is an optical measurement device used to measure the absorbance of dosimeters. It is designed to be simple and fast with the highest performance and quality.

The G30 Spectrophotometer uses specially designed dosimeter holders to fit a variety of dosimeters to include the B3 DoseStix and B3 WINdose dosimeters. This spectrophotometer is built for the fast-paced, high-volume processing environment, and reduces time spent at every step of the dosimetry process.

APPLICATION

The Genesys 30 is used for the measurement of optical absorbance of dosimeters using a select wavelength in the ultraviolet (UV) or visible spectrum, such as GEX B3 radiochromic film dosimeters, and FWT-60 radiochromic film dosimeters.

SPECIFICATIONS
Physical Specifications:

| GEX Part No. | Description | Product Dimensions | Packaging Dimensions | Product Weight |
|--------------|-----------------------------|---|--|----------------------|
| P4400 | Spectrophotometer – US Plug | 34.3 cm L x 38.1 cm W x 20.3 cm H (13.5" L x 15" W x 8" H) | 58.4 cm L x 50.8 cm W x 33.0 cm H (23" L x 20" W x 13" H) | 10.0 kg (22 lbs.) |
| P4400EU | Spectrophotometer – EU Plug | | | |
| P4400UK | Spectrophotometer – UK Plug | | | |

| | |
|------------------------------|---|
| Material | Molded plastic |
| Color | Grey and White |
| Printing | Thermo Scientific logo plate on front |
| Electrical Supply | 100–240 V, 50–60 Hz, selected automatically; 150 W maximum |
| Optical Design | Single-beam |
| Spectral Bandwidth(s) | 5 nm |
| Light Source | Tungsten-Halogen lamp |
| Detector | Silicon Photodiode |
| Scan Ordinate Modes | Absorbance, % Transmittance, % Reflectance, Kubelka-Munk, log (1/R), log (Abs), Abs*Factor, Intensity |
| Resolution | >1.6 (peak-to-valley ratio; toluene in hexane) |
| Wavelength | Range: 325 –1100 nm |
| | Accuracy: ±2 nm (full range 325 to 1100 nm) |
| | Repeatability: ≤ 1 nm |
| Scanning Speed | Automatic – up to 1200 nm/min; variable |
| Photometric | Range: -3A to +3A |
| | Display Range: -3A to +3A; 0 to 200,000 %T; 0 to 9,999,999 C |
| | Accuracy – Instrument: ±0.002 A (0 – 0.3A) 0.5% of ABS reading (0.301A – 2.5A) |
| | Repeatability: ±0.002 A |
| | Drift (Stability) <0.002 A/hr |
| | Noise: ≤0.001 A at 0A ≤0.001 A at 1A ≤0.002 A at 2A |
| Stray Light | <0.1 %T at 340nm and 400nm |

| | |
|-----------------------------|--|
| Baseline Flatness | <0.003 A |
| Keypad | Tactile rubber 23 keys with numeric keypad |
| Local Control Option | Display: Touchscreen LCD panel; 800 x 480; 12.7 cm (5 in) diagonal |

Included Components:

- Plastic insert plate with cuvette holder
- USB thumb drive
- Power cord
- USB interface cord

Packaging:

Unit is shipped in a cardboard box with a form-fitting foam enclosure.

Storage:

Store the instrument in a cool and dry location.

INSTALLATION

Please refer to the *Thermo Scientific Genesys 30 Spectrophotometer User Manual* and all other references for explicit detail on the specifications, set up, operation, performance verification, and general care of the instrument. Information supplied herein should be considered supplemental and specific to dosimetry usage.

CAUTION!

Whenever the spectrophotometer has been stored or shipped, immediate exposure to room air can cause condensation damage. Move the shipping cartons to the installation location at least 24 hours before installation. This allows the instrument to equilibrate at room temperature before the shipping cartons are opened and protective packaging is removed.

Unboxing:

After at least 24 hours, open the shipping box and remove the documentation packet and USB thumb drive. Remove the instrument from its shipping box.

Operating Environment:

Instrument was designed for use under the following conditions:

| | |
|--------------------|----------------------------|
| Temperature Range* | 5°C to 35°C (41°F to 95°F) |
| Relative Humidity | <20% to 80% noncondensing |
| Altitude | 0m to 200m |

*Operating the instrument outside of this temperature range may cause permanent damage.

Instrument performance should be verified when operating outside of the relative humidity (RH) and altitude ranges. GEX verified instrument performance at an altitude of approximately 1610m without any problems.

The instrument should be positioned on a surface that is level and free of vibration. Anytime the instrument location is moved, the user is advised to conduct performance verification testing. Consider all GLP's (Good Laboratory Practices) concerning cleanliness of the area.

Power and USB:

Connect the power cord and ensure the instrument's sample chamber is empty. Power 'ON' the spectrophotometer. The unit will perform a series of self-checks that will take approximately one minute.

Dosimeter Holders:

Install the hot-swappable baseplate and holders according to *GEX Doc# 100-168, Genesys 30 Dosimeter Holder System*.

IQ/OQ, CALIBRATION & PERFORMANCE VERIFICATION

Calibration:

This instrument has been certified by Thermo Scientific to conform to approved test specifications. A Production Test Report is included with the instrument.

The instrument is not required to be re-calibrated unless it is failing to meet performance verification specifications. See the section on 'Care & Maintenance' below for more information.

Performance Verification:

Please refer to page 26 of the Genesys 30 User Guide for complete information on performance verification.

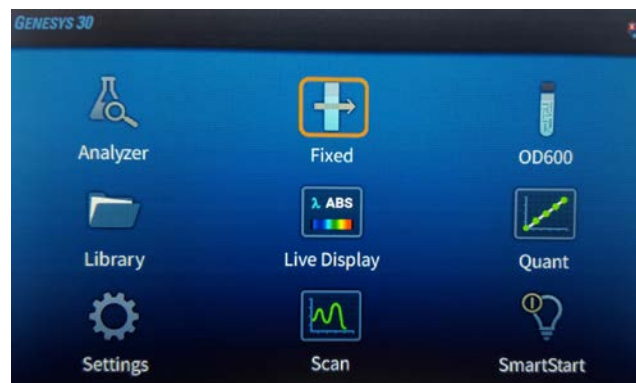
Operational Qualification (OQ):

Upon completion of any and all PV activities, the user must verify the operation of the instrument. The user should verify the ability of the instrument to reproducibly perform fixed wavelength measurements. It is suggested to perform a gage R&R study for each dosimeter type that will be used. It is suggested to conduct thirty (30) repeated measurements of single dosimeters irradiated at low, middle, and high doses in the user's range, and to reproduce this test for a minimum of three (3) days.

To complete these measurements, the protocol below must be followed in order to make fixed wavelength dosimeter measurements:

Protocol for Dosimeter Measurements:

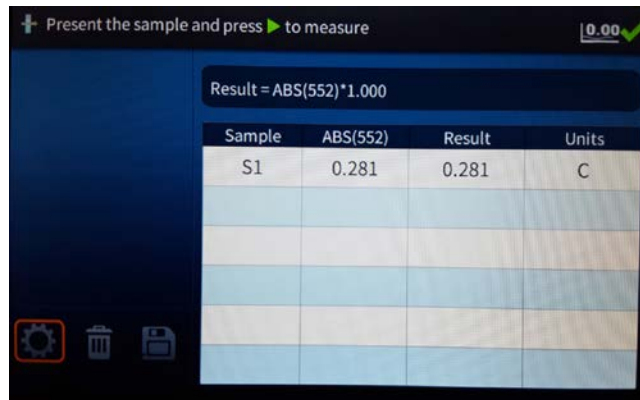
1. Insert the appropriate dosimeter holder according to GEX Doc #100-168, *Genesys 30 Dosimeter Holder System*.
2. From the instrument home screen, highlight "Fixed" and press the enter (↵) button.



3. Input the correct wavelength setting for the dosimeter type you are measuring and press "Done".




4. Ensure the dosimeter holder is empty, then zero the instrument by pressing the yellow “0.00” button.
5. After the instrument is zeroed, insert a dosimeter to be measured and press the green diamond-shaped button. The measurement will be captured on the screen.

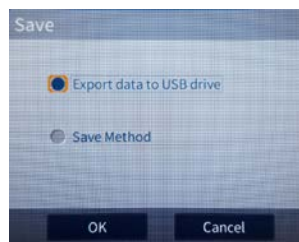



6. After the measurement is recorded, you may remove the dosimeter and insert the next sample to be measured. Repeat step 5 above for all dosimeters.

NOTE: Only 10 consecutive measurements may be taken. If more than 10 are needed, you must save or discard the data before proceeding. The recorded measurements may be output to an external USB drive in the form of .CSV files.

Saving a Measurement Session:

1. Insert a USB drive into the port located on the front of the G30.
2. Use the directional arrows to highlight the floppy disk icon  and press enter.
3. Use the enter key to select “Export data to USB drive” from the window that is displayed and press OK.



4. The top of the screen will display “Data is **successfully** saved” when complete.
5. The USB drive may be removed and the data transferred to a computer for review and analysis.
6. Clear out the measurements by selecting the trash can icon  and press enter.

CARE & MAINTENANCE

Cleaning:

The instrument’s exterior and the sample compartment should be periodically cleaned as part of a Preventative Maintenance program along with the dosimeter holder system. An instrument that is maintained and cared for will perform better and have a longer life. Complete cleaning instructions which include the proper materials can be found in the G30 User Guide. Instructions for cleaning the dosimeter holder system are located in *GEX Doc# 100-168, Genesys 30 Dosimeter Holder System*.

Lamp Replacement:

P4401 Tungsten-Halogen Lamp (light source) should be replaced every 800 hours. It is recommended to warm-up the instrument 15-30 minutes before use, and the lid may remain open during measurements. Measurement time for each dosimeter is less than 1 second.

If the device requires service for any reason there are two options:

(Note: Not all services are available with both options. Please consult with GEX or Thermo for more detail.)

1. Depot Service:

The Genesys 30 is designed to be serviced on-site, but from time to time it may need to be sent to Thermo Scientific in Madison, WI U.S.A. for repair or other services. Please contact GEX Customer Service for more information if depot service is required.

2. On-site Service & Service Agreements:

On-site service is available in some areas. A qualified technician can arrive on-site for cleaning, calibration, and maintenance on your Genesys 30. Service agreements may also be available in your area. Contact GEX Customer Service for details.

PRODUCT PHOTOS



Thermo Scientific Genesys 30 Spectrophotometer

ACCESSORIES

| GEX Part No. | Description | Purpose |
|-----------------------|------------------------------------|---|
| P4220 | Spectronic Standards Set | Photometric accuracy, wavelength accuracy verification |
| P4330 | GEX Hot-Swappable Base Plate | The base platform is the mount for all dosimeter holders as well as the laser micrometer and barcode reader. Beam tubes allow user to leave the lid open during measurements: protects measurements from stray light. |
| P4332 | DoseStix Dosimeter Holder | Dosimeter positioning for GEX DoseStix style dosimeters |
| P4334 | WINdose Dosimeter Holder | Dosimeter positioning for 1cm ² radiochromic film dosimeters |
| P4336 | PMMA Dosimeter Holder | Dosimeter positioning for Red and Amber Perspex PMMA dosimeters |
| P4350 | Laser Micrometer | Measures thickness of PMMA dosimeter inside the Evo220 |
| P4355 | Custom Gage blocks | For calibrating the P4350 Laser Micrometer |
| P4360 | B3 DoseStix Barcode Scanner | Barcode scanner and mounting post for automated B3 DoseStix barcode reading |
| P4401 | G30 Tungsten-Halogen Lamp Assembly | Genesys 30 Spectrophotometer light source |

PRECAUTIONS

Please refer to the Thermo Scientific Site and Safety User Guide for additional information and the full listing of precautions.

NOTICE:

Immediate exposure to room (ambient) air can cause condensation damage whenever the spectrophotometer has been stored or shipped. Move the shipping cartons to the installation location at least 24 hours before installation. This allows the instrument to equilibrate with the room temperature before the shipping cartons are opened and protective packaging is removed.

- Keep shipping cartons upright at all times. Damages due to improper moving techniques are not covered by the warranty.
- Connect the spectrophotometer to a suitable uninterruptible power supply to minimize line current fluctuations that may alter the measurement or damage the spectrophotometer.
- Keep the top cover closed and latched as much as possible. Minimize exposure of the spectrophotometer to airborne contaminants like smoke, dust, oil vapor, or chemical fumes.

WARRANTY/GUARANTEE

Warranty:

Please refer to the Thermo Scientific product information for warranty information. User modifications are not warranted and are the sole responsibility of the user.

Guarantee:

1 year GEX satisfaction guarantee. Product may be returned within one year from the date of delivery for any customer dissatisfaction.

REFERENCES

References:

- ISO 10012: Measurement Management Systems -- Requirements for Measurement Processes and Measuring Equipment
- ISO/ASTM 51261: Calibration of Routine Dosimetry Systems for Use in Radiation Processing
- ISO/ASTM 52628: Dosimetry for Use in Radiation Processing

Thermo Fisher Scientific Documents:

<http://www.thermoscientific.com>

- Genesys 30 User Guide
- Genesys 30 Setup Guide
- Genesys 30 Warranty Information
- Site & Safety Information
- Production Test Report

GEX Product Specification and Usage (PSU):

- GEX Doc #100-168, Genesys 30 Dosimeter Holder System

To learn more about GEX products and services, visit www.gexc corp.com or contact a GEX representative at +1 303 400-9640.