End-to-End Spectral Analysis: From R&D Continuous Logging to QA & FA Inline Inspection

TAMTEC GRANATUS

Multi-Vendor Optical Spectroscopy, Colorimetry & FA Inspection Software

Lab: R&D, Drift Logging & Automated Sweep
Inspection: QA Lot Sampling & HTML Reports
Inline: Direct PLC Control & FA Automation

A unified software platform for real-time spectral acquisition, intensity calibration, optical filter evaluation (%T, Optical Density OD, cut-on/off wavelengths, edge slope Δλ), CIE/JIS object color (L*a*b*) & light source CRI (Ra, R1–R15), long-term drift tracking, barcode-driven A4 inspection reports, and PLC-linked inline pass/fail judgment.

① Multi-Vendor USB & Turnkey Ready
Supports Ocean Insight, Avantes, OTO Photonics, etc. Software-only or turnkey optical sets available.

② Spec-Compliant Optical, OD & CRI
Eliminates spreadsheet post-processing; evaluates OD, cut-on/off, slope Δλ, ΔE*00 & CRI in real time.

③ A4 Inspection Reports, PLC & API
Generates HTML reports with Cp/Cpk & SVG overlays; native SLMP/Modbus PLC & Python/MCP API.

Solving Field Challenges Across 4 Key Domains (From R&D to Production QA)

TARGET APPLICATIONS

1. Optical Filter & Thin-Film Coating

Optical Design & QA

Simultaneously evaluates %T and Optical Density [OD]. Real-time pass/fail judgment for noise-canceling blocking OD (Mean->OD), sub-pixel cut-on/off (0.01 nm), edge slope width Δλ (e.g., T=80% to OD 3.0), ripple-tolerant CWL (AA/HA), and FWHM.

2. Light Source Drift & Automated Sweeps

R&D & University Labs

Tracks LED, halogen, and laser stability via 0.1–3600 s timer logging and [Δ Change] trend plots. Built-in HTTP JSON-RPC / MCP server enables synchronized angle (AOI), XY, current, or temperature sweeps from Python, LabVIEW, or C#.

3. QA Lot Sampling & A4 HTML Reports

Incoming / Outgoing QA

Switch product recipes via barcode scanner and record samples hands-free with a USB foot switch (includes Undo & audit trail). Automatically exports a 1-page A4 HTML/PDF report with Mean, σ, Cp/Cpk statistics, and SVG spectrum overlays.

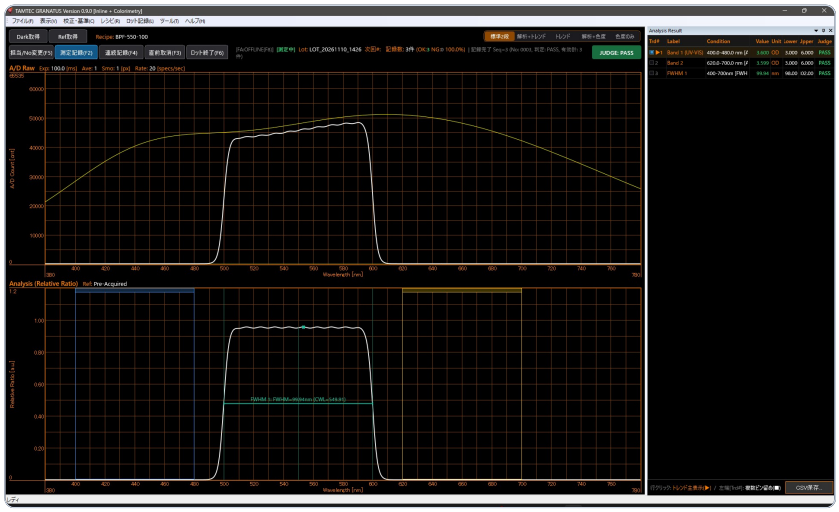
4. Object Color (ΔE*00) & Light CRI

+ Colorimetry Option

Complies with CIE / JIS standards for [Object Color] (L*a*b*, L*C*h°, CIEDE2000 ΔE*00 tolerance ellipse, Yellowness YI, Whiteness WI) and [Light Source Color] (CCT [K], Duv, general CRI Ra, and special CRI R1–R15 including saturated red R9).

Intuitive 1-Screen Cockpit (Raw A/D Monitor × Calibrated Spectrum × Live Pass/Fail)

MAIN INTERFACE



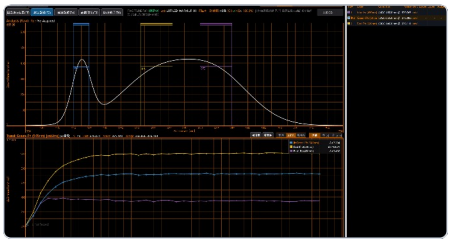
① 2-Tier Cockpit Bar (At-a-Glance Status)
Centralizes exposure time, auto-exposure, averaging, smoothing, calibration mode, lot progress, and PLC link status.

② Upper Pane: Raw A/D & Saturation Guard
Monitors live raw counts alongside Dark/Reference spectra. Automatically blocks recording upon sensor saturation.

③ Lower Pane: Calibrated Spectrum & Markers
Visualizes passband, blocking band, cut-on/off wavelengths, and FWHM markers directly on %T, OD, or irradiance plots.

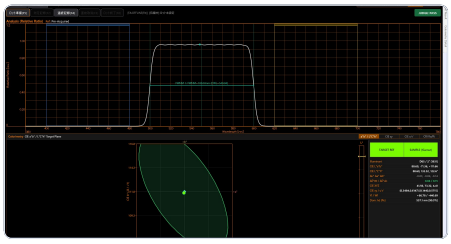
④ Right Pane: Master PASS / FAIL & Metrics
Displays live values, LSL/USL limits, and pass/fail badges. Automatically locks recipe editing during active runs.

[Analysis + Trend] Long-Term Drift Logging



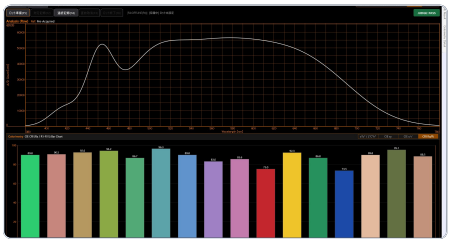
Plots up to 6 items simultaneously as [Δ Change] from initial baseline (0), including non-uniform pixel trapezoidal area.

[Object Color] CIEDE2000 Ellipse & YI



Visually judges color shift direction and magnitude against Target on the a*b* plane with CIEDE2000 tolerance contours.

[Light Source] CCT, Duv & 16-Bar CRI



Renders 16 Munsell-colored CRI bars (Ra, R1–R15) alongside CIE 1931 / 1976 chromaticity diagrams with Planckian locus.

3 Field-Proven Reliability Designs (Licensing, Poka-Yoke & Global Factory Parity)

OPERATIONAL EXCELLENCE

🔑 Field-Friendly License Binding
Lab binds to 1 PC (swap multiple spectrometers freely); Inspection/Inline binds to Spectrometer S/N (free cold-standby PC).

🛡️ Poka-Yoke Guards & Excel Resilience
Uncalibrated/saturation guards, recipe lock during runs, in-memory buffering when CSV is locked by Excel, and lot resume.

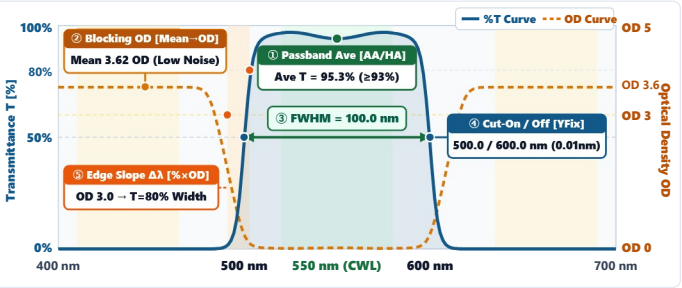
🌏 Mother-to-Overseas Factory Parity
Instant EN/JA UI and HTML report switching. Deploy XML recipes (recipes.xml) created in Japan directly to overseas plants.

Optical Evaluation Algorithms & FA Inline Inspection Architecture

OPTICAL METRICS & FA INLINE SYSTEM

Optical Filter & Thin-Film Evaluation Metrics ...

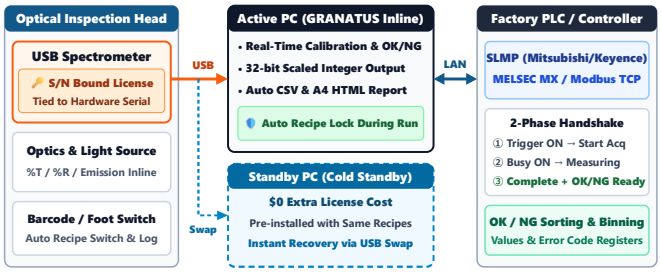
%T × Optical Density [OD]



① Passband average & peak (AA/HA) / ② Noise-canceling blocking OD (Mean->OD) / ③ FWHM & CWL / ④ Sub-pixel cut-on/off wavelength (YFix: 0.01 nm) / ⑤ Cross-domain edge slope Δλ (%T to OD)

FA Inline PLC Integration & Cold-Standby PC

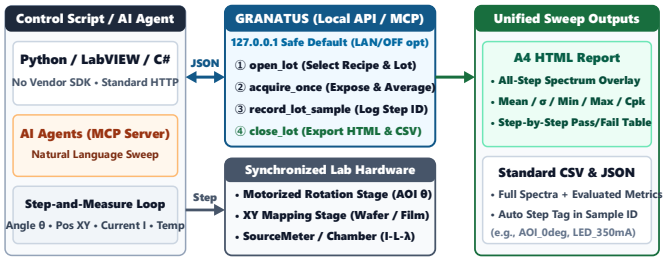
SLMP / MX / Modbus



Direct 2-phase PLC handshake and 32-bit scaled integer output. Spectrometer S/N licensing allows a pre-configured cold-standby PC at $0 extra software cost—recover instantly by swapping the USB cable.

Coordinated Sweep via Local HTTP API / MCP

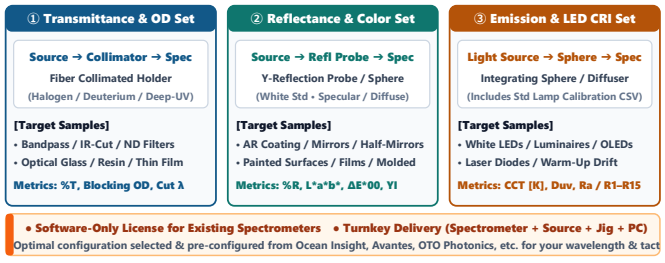
Python / LabVIEW / C#



No vendor SDK required. Synchronize with motorized stages (AOI angle / XY mapping), power supplies, or chambers, and automatically export an all-step overlay HTML report & CSV (127.0.0.1 default).

Turnkey Optical Setup Proposals (Spec + Source +...

Software / Turnkey Set



Available as software-only for your existing USB spectrometers, or as a pre-configured turnkey package (Spectrometer + Stabilized Source + Collimator / Probe / Sphere + PC with initial recipes).

Editions & Standard Pricing (Perpetual License • Includes 1st-Year Support)

EDITIONS & PRICING

Feature / Edition	GRANATUS Lab (R&D, Drift Logging & Sweep)	GRANATUS Inspection (QA Lot Sampling & Reports)	GRANATUS Inline (FA Machine & Line PLC Link)
Standard Price (Excl. Tax) + Colorimetry Bundle Price	**From 300,000 JPY** (TAMTEC-GRN-LAB) From 450,000 JPY (TAMTEC-GRN-LAB-C)	**Contact for Quote** (TAMTEC-GRN-INS) Contact for Quote (TAMTEC-GRN-INS-C)	**Contact for Quote** (TAMTEC-GRN-INL) Contact for Quote (TAMTEC-GRN-INL-C)
Calibration, Optical & Trend	● Included (OD / Slope / Trend / CSV)	● Included	● Included
Local HTTP API / MCP Automation	● Included (Acquire & Sweep Log)	● Included (+Lot, Barcode & Report)	● Included (+FA Trigger & PLC Link)
Pass/Fail, Lot Sampling & Report	— (Measurement & Logging Only)	● **OK/NG, Barcode & A4 HTML Report**	● **OK/NG, Barcode & A4 HTML Report**
Direct PLC Link & Auto Run	—	—	● **SLMP / MELSEC MX / Modbus TCP**
Standard License Binding	**PC Hardware ID** (Multi-Spec Swap OK)	**Spectrometer S/N** (Free Standby PC)	**Spectrometer S/N** (Free Standby PC)

- **+ Colorimetry Add-On** (TAMTEC-GRN-OPT-C): +150,000 JPY for Lab / Quote for Inspection & Inline
- **FA Startup & PLC Mapping Pack** (TAMTEC-GRN-SVC-FA): Contact for Quote
- **Lab 1-Year Subscription** (TAMTEC-GRN-LAB-1Y): Base 150,000 JPY/yr / Bundle 225,000 JPY/yr (Ideal for annual grants)
- **Hardware Bundle Discount / Multi-Line Volume Discount / Edition Upgrade by Price Difference**

Main Specifications & System Requirements

SPECIFICATIONS

OS & Recommended PC	Windows 10 / Windows 11 (64-bit) / Intel Core i5 or higher, 8 GB RAM or more, Full HD (1920×1080) or higher recommended / USB 2.0 / 3.0
Supported Spectrometers	Ocean Insight, Avantes, OTO Photonics USB spectrometers (custom profiles available for other brands) / UV, VIS & NIR wavelength ranges
Calibration & Preprocessing	Auto-exposure, temporal averaging, boxcar smoothing / 3 Calibration Modes: ① Raw [cnt] & Normalized [cnt/ms], ② %T / %R, ③ Relative Irradiance (Std Lamp CSV) / Golden Master CSV reference
Colorimetry (+Colorimetry)	Requires VIS (380–780 nm) spectrometer / [Object Color] CIE 15, ISO/CIE 11664, ASTM E313 (JIS Z 8781-1, Z 8781-3, Z 8781-4, Z 8730: XYZ, xy, u'v', L*a*b*, L*C*h°, ΔE*00, ΔE*ab, YI, WI) / [Light Source] CIE 13.3 (JIS Z 8725, Z 8726: CCT [K], Duv, Ra, R1–R15)
Outputs & External I/F	Standard CSV (single / timer / lot summary with audit trail & lot resume), A4 HTML Inspection Report (Cp/Cpk & embedded SVG overlay) / PLC: Ethernet (SLMP 3E / MX Component / Modbus TCP) / Local API: HTTP JSON-RPC 2.0 & MCP / Barcode (USB HID / COM), USB Foot Switch

For Distributors, Trading Companies & System Integrators (SIers)

- Available for wholesale distribution under standard **TAMTEC- SKU codes** as an official analysis & inspection software option for your spectrometers or optical inspection machines.
- Manufacturer engineers directly support demo unit installation, joint end-user proposals, primary technical support, and academic/public sector procurement.

* Custom software development and tailored optical measurement systems are also available upon request.

TAMON Co., Inc. Custom Optical Measurement Systems

▶ **Request a Free 30-Day Full-Featured Demo License, Quotation or Technical Consultation**

Higashi Bldg. 5F, 3-32-22 Honcho, Nakano-ku, Tokyo 164-0012, Japan ／ **TEL: +81-3-6276-5699**

Product Page: **https://www.tamon.co.jp/en/software/tamtec-granatus/**

Web Inquiry: **https://www.tamon.co.jp/en/contact/**

* Please mention "GRANATUS Demo Request" or your spectrometer brand/model (if known) when contacting us.

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