HORIBA

Accelerating Pharmaceutical Advancements

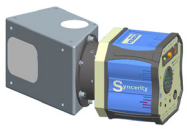
Through Partnership

HORIBA's Solutions for Pharmaceutical Analysis and Manufacturing

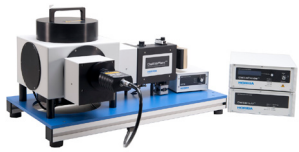
HORIBA is leading the charge to support Pharma in advancing next-generation biotherapeutics and pharmaceuticals, leveraging patented technologies to provide solutions that aid the development and manufacture of novel biomolecules and innovative delivery mechanisms to address a wide range of diseases.

Most Comprehensive Fluorescence Solutions

From **Modules** to **Modular** to **TCSPC Lifetime**...to **FLIM**


OEM Modules

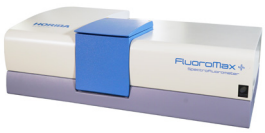

Fluorolog™-QM


Lifetime Fluorescence

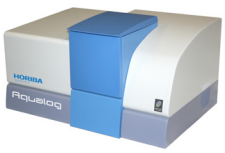
FLIM

Steady State Fluorescence in cuvettes, TCSPC Lifetime Fluorescence, Fluorescence Lifetime Imaging

From **Fluorescence** to **A-TEEM** to **A-TEEM for Pharma**...to **Process A-TEEM**



FluoroMax™ Plus



Aqualog™


Duetta™


Veloci™

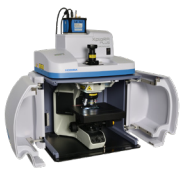

PI-200

PI-200-I

Development, Quantitative & Qualitative, CQA's, Pharma, Reaction Monitoring, At-line, In-line, On-line

Most Comprehensive Raman Solutions

From **Macro** to **Micro**...to **Nano Raman**


XploRA™ PLUS

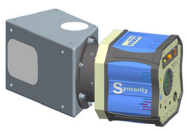

LabRAM Soleil™

LabRAM Odyssey™


NanoRaman™

Raman Microscopes for Imaging & Chemical Analysis (down to µm), Nanostructure sub µm imaging (AFM)

From **Modules** to **Lab**...to **Process Raman**


OEM Modules

MacroRAM™

PoliSpectra® RPR


PI-200


PI-200-I

Quantitative & Qualitative Analysis, CQA's, Reaction Monitoring, Off-line, At-line, In-line, On-line

Most Comprehensive Particle Characterization Solutions

From **Particle Size** to **Zeta Potential** to **Shape Identification**...to **Particle Concentration**


LA Series


EyeCon$_2$™


Analysette 28


SZ Series


SA Series


ViewSizer® 3000

Laser Diffraction, Image Analysis, Dynamic Light Scattering, Zeta Potential, BET, Nanoparticle Tracking

From **Actives** to **Excipients** to **Biotherapeutics**...to **Continuous PAT Analysis**


SZ Series


ViewSizer® 3000


Centrifuge


LA Series


EyeCon$_2$™

Life Science, Pharmaceutical, Semiconductor, Battery, Material, Food & Beverages

Spectroscopic Analysis

Technology to analyze materials by using ultraviolet, visible, and near-infrared light

Particle Measurement

Technology to characterize particles including size, shape, concentration, zeta potential, and identification

Infrared Measurement

Technology to analyze components in gas in real time

Fluid Control

Technology to instantly measure and control the flow of fluids

Liquid Analysis

Technology to measure components or characteristics in liquid, such as pH, sodium, acids, and alkalis

HORIBA utilizes solutions created from our core technologies to ascertain the changing needs of the market. The technologies have been cultivated from around the world to measure and analyze liquids, gases, and solids.

Solutions for the BioPharma/Pharma Value Chain

PoliSpectra® RPR Rapid Raman Plate Reader

Fully automated, high-throughput, non-destructive screening provides rapid testing of 96 liquid well plates per minute with live reaction monitoring.

Common Applications

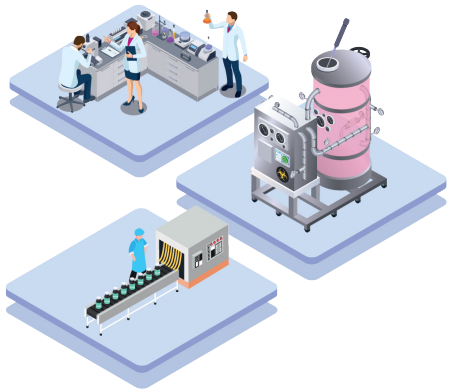
- Research & Discovery
- Preclinical Trials
- Formulation & Quality Control

MacroRAM™ Raman Spectrometer

Fast and reliable bulk analysis Raman spectrometer analyzes high concentration materials in cell media and API identity tasks.

Common Applications

- Research & Discovery
- Pilot Processing
- Formulation & Quality Control

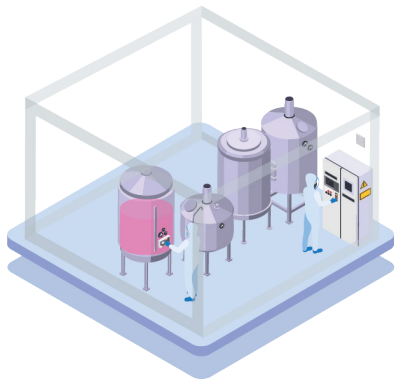


PI-200-I Raman Multi-stream Analyzer

Process Raman spectroscopy enables in situ monitoring of critical nutrient, metabolite, and byproduct concentrations, including glucose, lactate, and ammonia.

Common Applications

- Upstream Processing



Yumizen™ C560 Clinical Chemistry Analyzer

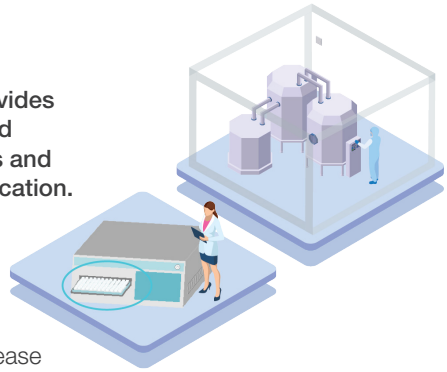
Supports more than 75 general chemistry tests and can process up to 560 tests/hr. Offers a broad range of open-channel general chemistry reagents.

Common Applications

- Clinical Trials

Veloci™ BioPharma Analyzer

A-TEEM fluorescence spectrometer provides rapid, cost-effective characterization and quantification of upstream raw materials and downstream product quality and identification.



Common Applications

- Cell Culture Media Preparation
- Downstream Processing and Product Release
- BioPharma Active Molecule and Formulation Development

A-TEEM™ Compliance Package

EzSpec with EzSpec-P11/ PLATINALINK

EzPAT

A-TEEM Direktor

Software and Instrument Validation

EzSpec-P11 and PLATINALINK for Part 11 compliance on benchtop instruments

EzPAT server for integration of A-TEEM into PAT orchestration software

A-TEEM Direktor for multivariate analysis modeling and prediction

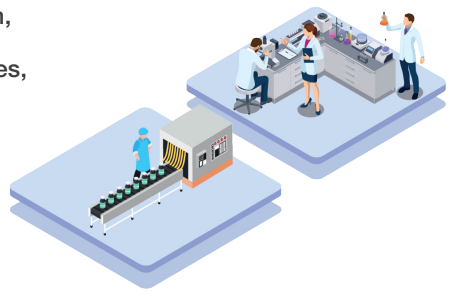
IQ/OQ documentation and procedures for instrument and software validation

Common Applications

- Regulatory Approval

ViewSizer® 3000 Nanoparticle Tracking Analysis (NTA)

Monitors particle size and concentration, supporting applications such as lipid nanoparticles (LNP), extracellular vesicles, viruses, and protein aggregates.

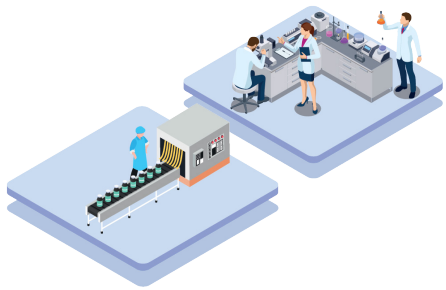


Common Applications

- Research & Discovery
- Formulation & Quality Control

Partica™ LA-960V2 Laser Diffraction Particle Size Analyzer

Unparalleled rapid particle size analysis from 10 nanometers up to 5 millimeters.



Common Applications

- Research & Discovery
- Formulation & Quality Control

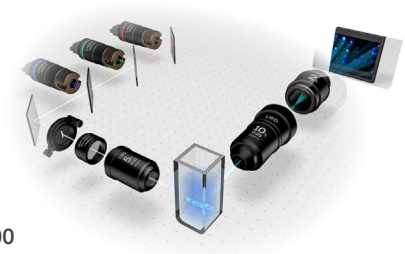
Application Case Studies

Reliable Analysis for Biological Nanoparticles

with Simultaneous Multispectral Detection (SMD) NTA

The ViewSizer® 3000 effectively monitors protein aggregation under different conditions, providing valuable insights for formulation development, manufacturing performance, and long-term product stability.

This information is crucial for ensuring the safety and efficacy of protein therapeutics in the biopharmaceutical industry.



ViewSizer® 3000

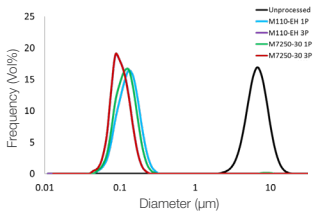
Analysis of Adjuvants

with Laser Diffraction

The HORIBA LA-960 laser diffraction analyzer effectively measures emulsions, from unprocessed particles above 1 micron to nanoemulsions below 100 nm after multiple passes through a microfluidizer. It has proven valuable in monitoring vaccine adjuvant sterile filtration processes, detecting agglomeration, and delivering highly repeatable results, making it an essential tool for both research and process control in drug delivery system development.

Automatic laser alignment and wide range of sample handlers ensure consistent and accurate results.

Partica™ LA-960V2

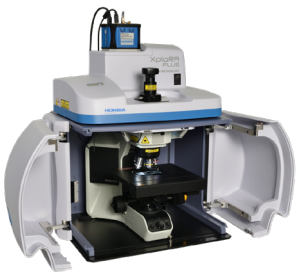


Suitable for a wide variety of sample types

Assessing Biotherapeutics Stability

with Raman Spectroscopy

Specific Raman vibrational bands, such as those associated with amide I, amide III, tryptophan (Trp), and tyrosine (Tyr), can be used to monitor protein folding, unfolding, and structural reorganization. The findings in one study highlight the potential of Raman spectroscopy for evaluating the stability and quality of biotherapeutics, offering valuable insights for the pharmaceutical industry in ensuring drug efficacy and safety.



Precise chemical and structural analysis with exceptional sensitivity

XploRA™ PLUS
MicroRaman spectrometer and confocal Raman microscope

Fluorescence in Vivo on Human Skin

Brief synopsis of case study and HORIBA product involved

In one study, the HORIBA Jobin Yvon Fluorolog® spectrofluorometer highlighted distinct fluorescence peaks at 295 nm, 340 nm, and 360 nm, corresponding to tryptophan in the epidermis and collagen cross-links in the dermis.

These fluorescence markers allow for the characterization and quantification of skin aging and photoaging, showing that UV exposure significantly alters the fluorescence spectra

Highly customizable system allows users to add or change components to suit specific research needs

Fluorolog-QM
Advanced modular fluorescence spectroscopy

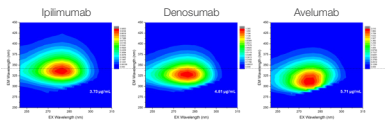
Sensitive Detection of Protein Fingerprint Variations

with Absorbance, Transmittance, and Fluorescence Excitation Emission Matrix (A-TEEM™)

Tryptophan steady-state fluorescence spectroscopy is a powerful tool for studying local structural changes, sub-unit interactions, substrate binding, and denaturation.

When combined with A-TEEM fluorescence molecular fingerprinting, it enables precise discrimination and quantification of key proteins like monoclonal antibodies (mAbs) and antibody-drug conjugates, supporting both R&D and quality control efforts.

Superior sensitivity compared to HPLC/MS and other techniques



Veloci™ BioPharma Analyzer

Quantitative Analysis of API in Formulations

with Raman Spectroscopy in Pharmaceutical Applications

Raman spectroscopy is capable of qualitative and quantitative chemical analysis.

In one study, the MacroRAM™ demonstrates its utility for quantitative analysis in diverse solution matrices, including single solutes, azeotropic mixtures, and multi-component formulations to determine active pharmaceutical ingredient (API) content in products like Excedrin®, DayQuil®, and NyQuil®.

Perfect for bulk analysis of solids, liquid solutions, powders, and gels

MacroRAM™

External probes allow for fast and easy measurements

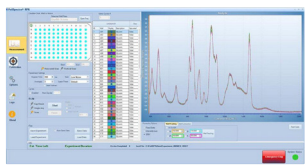
Determining the Concentration of Nucleoside Triphosphates

High-speed, High-throughput Temperature-controlled Screening of Biomedical Materials in Multiwell Plates

PoliSpectra® Rapid Raman Plate Reader (RPR) reads biomedical materials presented in multiwell plates to monitor their reactions, determine their concentrations, and much more.

In one case, RPR was used to determine the concentration of nucleoside triphosphates (NTPs) solutions in phosphate-buffered saline (PBS).

Fully automated process with dedicated control software



PoliSpectra® RPR

Protein Quantification at Low Concentration

with Duetta™ 3-in-1 Fluorescence and Absorbance Spectrofluorometer

The Duetta™ spectrofluorometer is known for its high sensitivity and ability to correct for the inner-filter effect (IFE).

In one study, the Duetta was used to measure transferrin at a concentration range from 50 µg/mL to 0.75 µg/mL in 10 mM PBS. With the excitation wavelength set to 250 nm and the emission collected from 265 nm to 550 nm with 2s integration time on the CCD and 10 nm slits, the Duetta was able to detect transferrin at 0.75 µg/mL using fluorescence.

Acquires a full spectrum from 250 nm to 1,100 nm in less than one second

Duetta™
3-in-1 Fluorescence and Absorbance Spectrofluorometer

HORIBA

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