

Article Overview

Optical cable dissolution operation uses fiber optic probes to perform in situ, real-time monitoring of dissolution processes without removing samples from the vessel.

Overview

Optical cable dissolution, often implemented with fiber optic UV systems, allows direct measurement of the concentration of active pharmaceutical ingredients (APIs) in dissolution media. Light is transmitted through optical fibers into the dissolution vessel, interacts with the sample, and returns to a spectrophotometer for absorbance measurement, enabling real-time, in situ analysis without the need for sample extraction or filtration (Agilent, Cary 60 FO system) .

System Components

- o Fiber Optic Probes: Typically made of silica fibers encased in stainless steel for robustness, with interchangeable tips of varying pathlengths (1-20 mm) to optimize light transmission and minimize particle interference .
- o Spectrophotometer: UV-Vis spectrophotometers, such as the Agilent Cary 60, provide rapid sampling and precise absorbance readings.
- o Manifold and Flow Cells: Some systems use remote flow cells integrated into a manifold, allowing liquid samples to circulate while optical measurements are taken, then returned to the vessel .
- o Multiplexers: Enable multiple probes to be used sequentially for high-throughput or multi-vessel analysis .

Operational Principles

- o Light Transmission: UV light is "pumped" through the fiber into the dissolution medium.
- o Absorbance Measurement: The light interacts with the sample, and the returning signal is measured to determine the concentration of dissolved compounds.
- o In Situ Analysis: Probes are lowered only during sampling to minimize hydrodynamic disturbance, and mathematical corrections (baseline or derivative spectroscopy) can compensate for scattering or non-API components .
- o Calibration: Systems are calibrated using blank or standard media to ensure accurate measurements, with validation parameters including linearity, range, limit of detection, and specificity .

Advantages

- o Rapid Sampling: Measurements can be taken as frequently as every 45 seconds.
- o Immediate Results: Real-time dissolution profiles allow faster decision-making.
- o Minimal Sample Handling: Reduces contamination risk and preserves sample integrity.

Optical Cable Dissolution Process

- o Versatility: Suitable for poorly stable compounds, high-viscosity media, and nano/microparticle formulations.
- o Low Maintenance: Few consumables and easy cleaning due to robust probe design .

Limitations

- o Not Suitable for HPLC Separation: Samples requiring chromatographic separation cannot be analyzed directly.
- o Pathlength Constraints: Very short pathlengths (

Optical Fibre and Cable Testing Performance verification forms an integral part of the manufacturing of optical fibre. The capability of

The Agilent Cary 60 fiber optic UV dissolution system performs in-situ UV dissolution analysis. Dedicated

It explains the step-by-step processes, essential tools, and best practices to help technicians achieve low-loss, high-reliability optical

- o Fiber optic dissolution systems started to appear in the mid 1990's.
- o They eliminate the need to remove the sample from the

In-situ Fiber Optics UV Dissolution methods overcome this labor intensive sampling and the technology has been

Splicing in optical fiber is the joining two fiber optic cables together. There are 2 methods of cable splicing, mechanical

Optical fiber cable carries information encoded in light pulses over long distances with lower signal loss compared to

Explore the optical cable manufacturing process. Learn about raw materials, fiber drawing, cabling, and quality control

Termination Process In order to terminate a Fiber Optic cable, the appropriate connector must be determined. The type of fiber-optic

Optical fiber cables and high-precision connectors are integral and necessary components of these systems. After appropriate optical

Optical Cable Dissolution Process

Ultraviolet (UV) fiber optic spectroscopy has been applied to dissolution testing for more than

In addition to the evaluation of the compound-independent figures of merit for this fiber-optic dissolution system, practical

Optical Fibre Cable Manufacturing Process Optical fibres in a cable are normally protected in one of two ways, either being tight

Opt-Diss 410 In-Situ Fiber Optic UV System for Dissolution Testing The Opt-Diss 410 brings dissolution measurement directly to the

Another advantage of fiber optics is the ability to analyze samples in real time. This is a benefit for samples with poor stability where

The UV fiber optics system has emerged in dissolution testing of solid dosage forms as a useful alternative to conventional

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