

# CORNING

## Corning Pharma Analytics

Corning is one of the world's leading innovators in materials science. For more than 160 years, Corning has applied its unparalleled expertise in both glass science and precision technologies to solve tough industry challenges and transform people's lives.

### *How you package your drugs is critical.*

We use our deep expertise in materials and glass science to conduct specialized testing and analysis of glass pharmaceutical packaging products. Our analytical services and in-depth technical insights enable pharmaceutical companies to solve their toughest glass packaging problems. We provide you with detailed investigation reports that identify the root cause of glass packaging issues and support you in finding solutions.

## Advanced Analyses

### Fractography

Using optical and scanning electron microscopy, our fractographers perform an in-depth analysis of glass container failures to determine the root cause of breaks and cracks, including:

- Root cause failure analysis
- Failure mechanism
- Field complaint and process analysis
- Optical characterization of defects, cracks, and fractures

### Mechanical Testing

We mechanically evaluate glass container reliability, including:

- Horizontal and vertical tests
- Failure load measurements
- Destructive testing, together with fractographic analysis for enhanced understanding of failure mechanisms

### Particulate Analyses

We can detect and fully characterize various particulate populations using:

- Detection and counting by Flow Cam/Microtrac and filtration and microscopic image analysis
- Characterization by scanning electron microscopy with energy dispersive x-ray spectroscopy (SEM-EDX)

### Chemical Analyses

We perform chemical analyses to characterize glass composition, identify potential sources of contamination that may occur during container manufacturing or filling line damage events, and understand container chemical durability, including:

- Surface topography and particle analysis using various optical microscopy techniques, SEM-EDX, and atomic force microscopy (AFM)
- Surface and depth profiling chemical analysis by dynamic and time-of-flight secondary ion mass spectrometry (D-SIMS, TOF-SIMS) and x-ray photoelectron spectroscopy (XPS)
- Chemical composition analysis by inductively coupled plasma optical emission spectroscopy (ICP-OES), flame emission (FE), wavelength dispersive and micro-beam x-ray fluorescence spectroscopy (WDXRF,  $\mu$ -XRF)
- Trace and ultra-trace elemental analysis by inductively coupled plasma mass spectrometry (ICP-MS, LA ICP-MS)
- Pharmacopeia, industry standards, and customized chemical durability testing

Along with detailed investigation reports, our experts will be available to work closely with you during the analysis process.

*In addition to testing, we are available to conduct on-site filling line evaluations to help you assess packaging performance and support your manufacturing needs.*

For a confidential consultation on customized testing, please contact us at [pharmatest@corning.com](mailto:pharmatest@corning.com). For more information, visit <http://corning.com/pharma-services>.



# Introducing...

## Corning Pharma Glass Forum

Corning has studied glass for over 160 years. Let us share that know-how with you.

Corning Pharma Glass Forum offers in-depth training on the production and performance of glass pharmaceutical packaging. Our glass scientists and fractographers lead training on glass chemistry and characterization, product manufacturing, and analytical techniques.

Sessions can take place at your location or at our R&D facility in Corning, NY. Each Corning Pharma Glass Forum agenda can be customized to fit your specific needs.

### Sample Agenda:

#### Day One

##### From Sand to Vial: An Overview of Glass Container Production

- How sand is melted to form glass
- How glass tubing for pharmaceutical use is produced
- Introduction to how glass tubing is converted into pharmaceutical containers
- Glass chemistry and characterization

#### Day Two

##### The Science of Glass Converting

- Deep-dive into converting process
- Identifying converting defects and determining their root cause
- Quality system and controls to protect against defects
- Discussion of industry improvements for current quality issues

#### Day Three

##### Introduction to Glass Analytical Techniques

- Non-mechanical glass analytical techniques (e.g., SHR, delamination testing)
- Mechanical glass analytical techniques (e.g., fractography, strength testing)

#### Day Four

*optional, if hosted by Corning*

Hands-on Session in Glass Fractography Lab

## CORNING

For more information on scheduling your Corning Pharma Glass Forum session, please contact us at [pharmatest@corning.com](mailto:pharmatest@corning.com).

