

Container Closure Integrity Testing

Overview

This workshop focuses on theoretical and practical fundamentals of various CCI testing technologies and provides a systematic approach to apply these testing methods for CCI verification throughout drug product lifecycle. The Workshop will enable the participants to implement CCI testing strategies to ensure adequate drug product protection and be compliant with relevant regulatory and compendia requirements. In this Workshop, participants gain critical problem solving skills through:

- interactive discussions with a panel of cross-functional technical experts consisting of CCI testing laboratory experts, testing instrument suppliers/manufacturers, and pharmaceutical packaging development engineers
- hands-on testing training on the newest innovations and state-of-the-art instruments
- real-world case studies

Who Should Attend

- Parenteral drug packaging engineers and formulation scientists
- Laboratory scientific staff and managers
- Parenteral manufacturing staff
- Sterility Quality Assurance
- Regulatory affair scientists
- Pharmaceutical packaging component manufacturing staff

Presentation of Technology, Instruments Demo and Hands-on Training kindly supported by several suppliers of Container Closure Integrity testing systems and services (detailed supplier update coming soon).

Learning Objectives

This workshop utilizes lectures, case studies, and interactive hands-on training on testing instruments to provide insight into the latest developments of Container Closure Integrity (CCI) Testing, with focus on achieving the following key objectives:

- Understanding up-to-date regulatory and pharmacopeia requirements on CCI.
- Defining CCI requirements for various container and drug product types using a risk-based approach.
- Explaining working principles of various CCI testing techniques and their practical applications, with focus on deterministic methods such as tracer gas detection (e.g. helium leak detection), electrical conductivity and capacitance (HVLD), vacuum decay leak detection, laser-based gas headspace analysis, mass extraction leak test.
- Selecting and applying appropriate testing methods for both laboratory and in-process testing to formulate comprehensive package integrity verification profiles.
- Defining CCI testing method development and validation approach and best practices.
- Avoiding common issues and pitfalls in CCI testing applications.



Lei Li, Ph.D., Associate Engineer Advisor Delivery and Device R&D, Eli Lilly

Lei Li currently serves as an engineer advisor at Delivery and Device R&D, Eli Lilly and Company. Lei has 9 years of experience in pharmaceutical and medical device industry, with focus on developing API and drug product packaging in support of clinical development and product commercialization, and establishing cold-chain distribution for biologic products. His current responsibilities include developing package integrity verification profiles for Lilly's diverse pipeline portfolio, developing and validating CCI testing methods, and supporting commercial control strategy development for CCI verification throughout drug product and device life cycle. He is a frequent speaker at PDA conferences and author of peer-reviewed articles and book chapters on CCI test methods. Lei Li received his Ph. D. in Analytical Chemistry from West Virginia University; prior to joining Eli Lilly, he worked at GE Plastics as an analytical and material scientist.

Thursday, 21 March 2019 9:00 – 17:30

- 9:00 Welcome and Introduction**
- 9:15 Regulatory Requirements:**
CCI Introduction, Regulatory Requirements, and Industry Trends
- 9:45 CCI Assurance throughout Product Lifecycle**
- Testing requirement definition – risk based approach
 - CCI Profile & Testing strategy development
- 10:30 Coffee Break**
- 11:00 Introduction to Group Exercise #1:**
Product life cycle testing and method selection
- 11:15 CCI Test Methods: Fundamentals and Overview**
- CCI defects and commonly used positive controls
 - “Sizing” CCI defects using gas flow dynamics
 - Evolution of CCI testing technology: liquid flow, gas flow, electron flow (electric current)
- 12:00 Lunch Break**
- 13:00 CCI Test Methods: Fundamentals and Overview**
(continued)
- Deterministic vs probabilistic definitions
 - Physicochemical methods vs microbiological methods: differences and correlations
 - Microbial and Dye Ingress Testing Basics
 - Seal Quality Testing
 - Introduction **group exercise #2: Method Characteristics**
- 14:00 Advanced CCI Testing Technologies**
- Vacuum and pressure decay
 - Mass Extraction
 - Headspace analysis
 - HVLD
- 15:00 Coffee Break**
- 15:30 CCI Testing Technologies** (continued)
- Tracer gas (helium leak detection)
 - Seal Integrity method example (residual seal force)

16:00 Current Topics: Industry Best-Practices and Novel Technologies

1. AMI Optical emission spectroscopy for CCI testing
2. API Container Testing using HeLD;
Review Helium leak detection video

17:00 Group Exercise #2: Method Characteristics

- review, discussion
- Day 1 Review, Q&A**

17:30 End of Day 1**Friday, 22 March 2019 8:30 – 16:30****8:30 Application Case Studies – Section 1**

- Vacuum and pressure decay
- Mass Extraction

9:10 Hands-on Training**9:50 Application Case Studies – Section 2**

- Headspace analysis
- HVLD

10:30 Coffee Break**11:00 Application Case Studies – Section 3**

- Tracer gas (helium leak detection)
- SQT (Residual Seal Force)

11:40 Instrument Demo and Hands-on Training**12:40 Lunch Break****13:40 Development and Validation of Integrity Test Methods**

- Method development best practices
- Method validation strategy
- Pitfalls and solutions

14:30 Approaches to CCI Testing Method Selection

- Method selection considerations
- Class discussion - examples

15:00 Coffee Break**15:30 Group Exercise #1: Method Selection Review, Discussion, Q&A****16:00 Class Discussion, Recognition, Certification****16:30 End of Workshop****Allison L. Dill, PhD, Eli Lilly and Company**

Allison Dill, Ph.D. is a Senior Research Scientist in Delivery and Device Connected Solutions at Eli Lilly and Company, Indianapolis, IN. She received a BS in Chemistry and Biology from Indiana University, and worked for 4 years as an analytical chemist in Product Research and Development before attending graduate school. She received her Ph.D. in Analytical Chemistry from Purdue University, studying imaging mass spectrometry for disease state characterization. While at Lilly, she has been responsible for the analytical control strategy of many solid oral and parenteral dosage forms and has contributed to several regulatory submissions. Her recent contributions have focused on enabling the delivery of the early phase portfolio within a complex global network with responsibility for the analytical control strategy of both the active pharmaceutical ingredient and the drug product. She is now focusing on the CCI strategy for multiple molecules with a concentration in on-line high voltage leak detection for 100% inspection.