# Lyophilization – Modern Techniques & New Requirements

## Opportunities and Challenges for the Pharmaceutical Industry

With a view on the implications of the New EU GMP Annex 1!

Part of PharmaCongress 2024

19/20 March 2024

Wiesbaden, Germany

## Highlights

- Annex 1 Impact and Inspection Experience
- Process Validation and ongoing Lifecycle Verification
- Atmospheric & Continuous Freeze Drying
- Lyophilization Technology - Design Requirements and Technical Solutions
- Aseptic Lyophilization with the Help of Protective Membrane Bags
- Container Closure Integrity
- Process Simulation / Media Fill
- Aseptic Filling and Lyophilization of Parenterals in RABS
- Improving Sustainability of Pharmaceutical Freeze Drying

## Speakers

**Thomas Beutler** | GEA, Germany

**Francis Carroll** | West, Ireland

**Dr Tino Galgon** | Lyocontract, Germany

**Xavier Gómez** | Telstar, Spain

**Frank Heck** | CSL Behring, Germany

**Prof Alf Lamprecht** | University of Bonn, Germany

**Dr Benjamin Ledermann** | GEA, Germany

**Rolf Lenhardt** | Teclen, Germany

**Heide Nagel** | Novartis Pharma Stein, Switzerland

**Matthias Schaar** | Novartis, Switzerland

**Dr Frank Sielaff** | Hessian State Office of Health and Care, Germany

**Dr Andrea Weiland-Waibel** | ExplicatPharma, Germany

GMP-PHARMA CONGRESS

This conference is part of PharmaCongress 2024

ECA Academy
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Image: GEA


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## OBJECTIVES

Take advantage of the opportunity to focus on **freeze drying technologies and processes** and get a first-hand demonstration of solutions for diverse requirements. Further, you will learn how the freeze drying output is affected by different equipment, parameter changes, solvents, etc.

## BACKGROUND

Lyophilization (or freeze drying) is one of the most exciting technologies in the pharmaceutical industry, although it is a very old process for the preservation of unstable materials. Trends are growing towards using non-aqueous systems.

Additionally, Process Analytical Technology (PAT) / RTRT (Real Time Release Testing, Annex 17 of the EU GMP Guide) systems for in-line process monitoring are used to control and determine critical processing parameters. PAT plays also an important role in continuous lyophilization processes. According to ICH´s new guideline Q13 "*continuous manufacturing (CM) has potential for improving the efficiency, agility, and flexibility of drug substance and drug product manufacturing*". Regulatory agencies have seen more companies engaged in the development and implementation of CM in recent years than in the past.
Modern QbD (Quality by Design) development following ICH Q8, Q9 and Q10 is based on the objective to design a lyophilization cycle applying a systematic and scientific approach instead of trial

# PROGRAMME 19 March 2024

## Regulatory Overview, Annex 1 Impact and Inspection Experience

Dr Frank Sielaff, *Hessian State Office of Health and Care, Germany*

- Regulatory framework (EU), impact for Lyo-Products
- Impact of new Annex 1
- Inspection experience

## Process Validation of Lyophilized Products and ongoing Lifecycle Verification

Dr Andrea Weiland, *ExplicatPharma*

- Critical quality attributes (CQAs) and critical process parameters (CPPs):
  - Assessment of CPPs through robustness testing to establish the process boundaries as the basis for the transfer from lab to commercial scale
- Freeze drying scale-up and validation:
  - Process qualification/validation in lyophilization strategies in relation to FDA/EMA modern process validation guidelines
- Process control strategies:
  - Hot and cold spot determination to allow for process control by using a product temperature PAT device

## Lyophilized Plasma Products - Experience and Technical Challenges in Refrigeration

Frank Heck, *CSL Behring*

The operator's point of view:

- Freeze technology through the ages
- Freeze drying, but please climate friendly
- Plate cooling and the requirements for technical components in the product environment
- Methodologies for condition-based technical monitoring
- Outlook

## Atmospheric Spray Freeze Drying

Prof Alf Lamprecht, *University of Bonn*

- Process understanding, monitoring & control
- Design of continuous lyophilization

## New Automatic Format Change System for the Transportation of Freeze-Drying Vials

Xavier Gómez, *Telstar*

- A new solution to preserve the integrity of the product and operator's safety during format changeover
- How to simplify logistics in pharmaceutical plants (cleaning, sterilization, storage area, etc.)
- Investment vs operational costs

## Improving the Sustainability of Pharmaceutical Freeze Drying

Dr Benjamin Ledermann, *GEA*

Thomas Beutler, *GEA*

- Natural refrigerants
- Microwave-assisted freeze drying
- Atmospheric spray freeze drying
- Drying time reduction
- GWP reduction

Image: GEA

and error. Sufficient process understanding is essential to achieve a robust production process and efficient handling of post-approval changes (life cycle management according to ICH Q12) of a freeze-drying process.
There is an increasing trend in aseptically produced lyophilized products, including peptides and proteins. Owing to the nature of these biological products, the lyo-cycle is more complicated and, in most cases, even longer than for other medicinal products.
The utility of lyophilization goes far beyond the vial. Principles of low temperature, low pressure can be applied to stabilize substances ranging from high potent APIs, novel medical devices, biologics and nanomaterials, freeze drying offers multiple opportunities.

## TARGET AUDIENCE

This conference addresses specialists and executives working in the fields of pharmaceutical manufacture, research and development and quality control, as well as engineers, project/facility engineers, especially those involved in the implementation of new monitoring methods for controlled nucleation, risk-based scale-up models and process technology for freeze drying processes. The conference is also of interest for participants working in the areas of container development and manufacturing process/packaging.

## MODERATOR

Dr Ingrid Walther, *Pharma Consulting Walther*

# PROGRAMME 20 March 2024

### Vials and Stoppers for Lyophilization

Francis Carroll, *West*

- Primary packaging aspects for lyophilization
- Considerations for lyo stoppers
- Considerations for lyo vials
- Volatile Extractables
- EU GMP Annex I

### Container Closure Integrity

Matthias Schaar, *Novartis*

- Applicable CCIT and Process Analytical Technologies via non-destructive methodologies
- Examples

### Aseptic Process Simulation (Media Fill)

Heide Nagel, *Novartis Pharma Stein*

- Media Fill Design
- Worst-case parameters for Media Fills
- Validation of lyophilization processes with Media Fills
- Requirements for Media Fills
- Trends with regards to Media Fills

### Annex 1 Upgrade of Aseptic Filling and Lyophilization of Parenterals in RABS

Dr Tino Galgon, *Lyocontract*

- GAP analysis in relation to the new Annex 1
- Risk-based determination of monitoring points for the B area
- Risk-based upgrade of monitoring in the aseptic core zone (RABS)
- Implementation of a new stopper sterilization and drying system
- Integration of a glove lifecycle including testing, cleaning and sterilization

### Aseptic Lyophilization with the Help of Protective Membrane Bags

Rolf Lenhardt, *Teclen*

- Annex 1 requirements for aseptic lyophilization processes
- Lyophilization protection with membrane technology for vials
- Sterile bagging unit for small sterile batches with open RABS or Isolator
- Are pilot freeze dryer without CIP/SIP suitable for aseptic processing in combination with sterile bagging unit

# SPEAKERS

**Thomas Beutler**
*GEA, Germany*
Thomas Beutler holds a Dipl.-Ing. degree in electrical engineering. In the first seven years of his career he created hardware and software for packing machines. Since 1997 he has been working in the freeze drying business. At that time the company belonged to STERIS. The freeze drying business was then taken over in 2005 by GEA. Since 2008 he was responsible for the process design of GEA Lyophil freeze dryers. In 2012 he also took on the responsibility as head of the project management to build a bridge between the engineering department and the needs of project managers. Since 2016 he has been responsible for the technology management lyophilization of GEA Lyophil.

**Francis Carroll**
*West, Ireland*
Francis is a Snr.Technical Account Specialist at West and has almost 20 years' pharmaceutical industry experience across various disciplines, including Sterile Fill Finish, Lyophilization Scale-up and Optimization, Technology Transfer, and Extractable/Leachables. In his current role, he supports West customers to choose optimized primary packaging components for their drug products and associated ongoing technical support.

**Dr Tino Galgon,**
*Lyocontract, Germany*
Tino is Managing Director of LYOCONTRACT GmbH with more than 20 years of experience in pharmaceutical industry. LYOCONTRACT is a specialized CMO for aseptic manufacturing and lyophilisation and is based in Germany.

**Xavier Gómez**
*Telstar, Spain*
Xavier Gómez, Lyophilization Product Manager at Telstar, holds a bachelor's degree in Industrial Engineering from the "UPC Terrassa" Spain and a master's degree in Mechatronics from "UPC Barcelona" Spain. Xavi started his career at CTM, a technological center located in Manresa. Since 2015, firstly as a freeze-drying Mechanical Engineer and then in the R&D department, he has been developing different projects related to the Life Science industry. It is worthy to note that Xavi participated as a key role in the development of many new breakthrough projects in the field of freeze-drying technology, like the Lyogistics Zero and Smart R3.

**Frank Heck**
*CSL Behring, Germany*
Frank is currently Process Technology Site Lead at CSL Behring GmbH in Marburg. He has worked at CSL in various engineering functions since 1999.

**Prof Alf Lamprecht**
*University of Bonn, Germany*
Alf Lamprecht has been Professor for Pharmaceutical Technology and Biopharmacy at the University of Bonn since October 2007. His current work includes the development of continuous atmospheric freeze-drying processes.

**Dr Benjamin Ledermann**
*GEA, Germany*
Benjamin joined the GEA Lyophil GmbH as an expert for freeze drying technology in 2018. At GEA he is involved in the development and evaluation of novel technologies like microwave-assisted freeze drying and controlled nucleation.

**Rolf Lenhardt**
*Teclen, Germany*
Rolf is a Process-Engineer by education (Dipl.-Ing. Univ.) and has 15 years of experience in the pharmaceutical industry. He is Founder and Managing Director of Teclen GmbH with deep knowledge in protective membrane for lyophilization.

**Heide Nagel**
*Novartis Pharma Stein AG, Switzerland*
Since 2012 at Novartis Pharma AG, as Senior QA Expert with main focus on QA-Oversight. Currently within Manufacturing Science & Technology (MS&T) as Senior Process Expert Microbiology, Sterility Assurance responsible to establish microbiological concepts for sterile manufacturing (Microbial Control Strategy).

**Matthias Schaar**
*Novartis, Switzerland*
Matthias started his career at Novartis Pharma Stein AG in the Microbiological Department. Since 2012 he is leading the Qualification & Infrastructure team.

**Dr Frank Sielaff**
*GMP Inspector, Germany*
Frank is GMP Inspector at the competent authority of Hessen with focus on inspection of drug manufacturers and laboratories in Germany and countries outside of the EU. Before joining the GMP inspectorate Dr Sielaff was several years employed in the pharmaceutical industry as Head of QC and as QP.

**Dr Andrea Weiland-Waibel**
*ExplicatPharma GmbH, Germany*
Andrea held several leadership positions within Pfizer, working as Project Manager in process technology and being responsible for technology transfer & process development. After joining IDEA AG, a biotechnology company based in Munich, Andrea held the position of Director Pharmaceutical Development. She is founder of Explicat Pharma GmbH and Managing Director since 2005.

The guiding theme of the GMP PharmaCongress 2024 on 19/20 March will be „users sharing challenges and solutions in practice". Therefore, benefit from your colleagues' experience and from the direct information exchange at the GMP PharmaCongress & GMP PharmaTechnica 2024.

## The Conference Tracks

As a participant you can switch between any of the **11 conference tracks** any time and also visit the PharmaTechnica Expo with more than 110 international exhibitors.

| The GMP PharmaCongress Conference Tracks | 19 March 2024 | 20 March 2024 |
|---|---|---|
| Non-Sterile Products – Challenges in Manufacturing & Quality | ✓ | n.a. |
| GMP – Green or Good Manufacturing Practice? | ✓ | n.a. |
| Packaging/Packaging Materials – Challenges & Solutions | n.a. | ✓ |
| European Aseptic Conference – Technology | ✓ | ✓ |
| Trends in Barrier Systems & Robotics | ✓ | ✓ |
| Modern Cleanroom Technology | ✓ | ✓ |
| Digitalisation & Artificial Intelligence | ✓ | ✓ |
| GMP for Pre-Filled Syringes (PFS) | ✓ | ✓ |
| Lyophilization – Modern Techniques & New Requirements | ✓ | ✓ |
| ATMPs – Hurdles & Achievements in Quality and Safety | ✓ | ✓ |
| Vaccines – Advantages & Challenges in Manufacturing | ✓ | ✓ |
| GMP PharmaTechnica Expo | ✓ | ✓ |

### Keynote on 19 March 2024

**Manufacturing of Pandemic Vaccines – Manufacturing & Supply Solutions Enabling the Delivery of Large Numbers of Vaccine Doses**

**Dr Guido Dietrich, *CEPI***

### Keynote on 20 March 2024

**Presentation by the Wallhäußer Innovation Award Winner**

In the Live Demo Area in the PharmaTechnica Expo hall you will benefit from the exhibitors' demonstrations – presenting their latest technology, products and services. Take advantage of these live performances – and get to feel and experience their products. For a list of all companies exhibiting at PharmaTechnica, please see the exhibitor list and plan on the website at **www.pharma-congress.com**.

| Day | Time | Exhibitor | Stand | Live Demo |
|---|---|---|---|---|
| 19 March 2024 | 10.00–10.15h | Ellab | A 16 | Self mapping made easy |
| | 10.15–10.30 h | boTec | A 7 | Optimized planning and operation of pharmaceutical storage and distribution systems |
| | 11.15–11.30 h | Bausch+Ströbel | A 33 | OMNIA - Boost your processes and step closer to your pharmaceutical plant of the future |
| | 11.30–11.45 h | Merck | B 32 | Annex 1's "Specific Risks Associated with Single-Use Systems" |
| | 11.45–12.00 h | Cytiva | C 5 | Point-of-use leak testing of single-use systems |
| | 12.30–12.45 h | MK Versuchsanlagen | A 12 | State of the art testing of barrier systems |
| | 12.45–13.00 h | Innerspace | B 14 | Aseptic Training with Virtual Reality |
| | 13.00–13.15 h | MBV | B 20 | MBV MAS-100 ISO – Microbial Air Sampler |
| | 15.00–15.15 h | ZETA | B 12 | Intelligent solution for passing single-use tubes through cleanroom walls |
| | 15.15–15.30 h | Friedrich Sailer | B 31 | Shining Solutions: Live Demo of Cutting-Edge Stainless Steel Cleanroom Equipment |
| | 15.30–15.45 h | Particle Measuring Systems | C 7 | Facility Monitoring Systems |
| 20 March 2024 | 09.45–10.00 h | PHARMAPLAN | A 37 | Virtual Pharma Campus |
| | 10.00–10.15 h | Emerson Automation Solutions | B 22 | Real-Time Scheduling and Production Optimization |
| | 10.15–10.30 h | Yokogawa | C 9 | Predict, Prevent, Perform: A Proactive Approach to Asset Health in the Pharmaceutical Industry |
| | 12.00–12.15 h | REA Elektronik | B 29 | Experts in Printing and Code Verification of pharmaceutical and medical-device packaging (f.e.UDI/MDR) |
| | 12.15–12.30 h | IWT / Tecniplast | B 21 | High pressure cleaning in pharmaceutical production. Advantages, challenges, sustainability and savings |
| | 12.30–12.45 h | Quascenta Pte | B 6 | Using an Intelligent Lifecycle-Based Solution for Streamlined Product Tracking, Design Optimization, Collaboration, and Reporting |
| | 12.45–13.00 h | Kneat Solutions | C 12 | Kneat Gx Demo |

Live Demos and Times Subject to Change

Easy Registration

Registration Form:
CONCEPT HEIDELBERG
Rischerstraße 8
69123 Heidelberg

Registration Form:
(06221) 84 44 34

E-Mail:
info@concept-heidelberg.de

Internet:
www.pharma-congress.com

## Congress Dates
Tuesday, 19 March 2024, 09.00 - 18.00 h
Wednesday 20 March 2024, 09.00 - 17.00 h
Registration
Tuesday & Wednesday, 19/20 March 2024, 08.00 - 09.00 h

## Fees
The one day ticket is available for € 690,- plus VAT, both days for € 1,380.- plus VAT. It includes participation in any track on that day and the visit of the PharmaTechnica Expo. In addition, lunch and beverages during the tracks and in breaks as well as the social event on the evening of the first congress day, 19 March is included; please mark if you would like to attend the Social Event. The fee is payable in advance after receipt of invoice.

## Venue
RheinMain CongressCenter (rmcc)
Friedrich-Ebert-Allee 1 | 65189 Wiesbaden
Phone: +49 (0) 611 1729-444
E-Mail: veranstaltungsservice-rmcc@wicm.de

## Accommodation
CONCEPT HEIDELBERG has reserved a limited number of rooms close to the CongressCenter. You will receive a room reservation form when you have registered for the conference. Reservation should be made directly with the hotel. Early reservation is recommended.

## Registration
Via the attached reservation form, by e-mail or by fax message. Or you register online at www.gmp-compliance.org.

## Presentations/Certificate
The presentations for this event will be available for you to download and print before and after the event. Please note that no printed materials will be handed out on site and that there will not be any opportunity to print the presentations on site. After the event, you will automatically receive your certificate of participation.

## Conference language
The official conference language will be English.

## Organisation and Contact
ECA has entrusted Concept Heidelberg with the organisation of this event.
CONCEPT HEIDELBERG
P.O.Box 10 17 64
69007 Heidelberg, Germany
Phone: +49 (0) 62 21 / 84 44-0 | Fax: +49 (0) 62 21 / 84 44 34
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For questions regarding content please contact:
Dr Andrea Kühn-Hebecker (Operations Director) at
+49 (0) 62 21 / 84 44 35, or at kuehn@concept-heidelberg.de

For questions regarding organisation please contact:
Mr Ronny Strohwald (Organisation Manager) at
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Reservation Form (Please complete in full)

# Lyophilization – Modern Techniques & New Requirements

Part of PharmaCongress 2024 | 19/20 March 2024, Wiesbaden, Germany

☐ Day 1 & 2 (19/20 March 2024)
☐ Day 1 (19 March 2024)
☐ Day 2 (20 March 2024)

☐ Yes, I would also like to take part in the Social Event on the evening of 19 March 2024.

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- Cancellation until 4 weeks prior to the conference 10 %,
- Cancellation until 3 weeks prior to the conference 25 %,
- Cancellation until 2 weeks prior to the conference 50 %
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