

# Freeze-Drying Technology

Principles  
and current  
practice

## Product and Process

Freeze drying experts **Biopharma Technology Ltd (BTL)** present a practical two-day course covering the science and application of freeze drying.

Freeze drying is a complex process. Many of the materials that are freeze-dried are composed of multiple elements which may give variable and unpredictable freezing and drying behaviour. This in-depth course will provide up-to-date information on the key aspects of the science of freeze drying, from techniques of cycle development to must-have information for formulation development.

This course is suitable for those involved in all stages of freeze drying formulation and cycle development and scale-up, including researchers, technicians, formulation scientists and quality control officers.

**Price:**  
**£850.**

Discounts are available for early registration & payment, for academia and for multiple bookings. Please contact us for more information.

### **Freeze Drying: Product and Process**

**23rd-24th November 2010**

We also run courses in Freeze Drying: Design and Engineering. For more information check online at [www.lyophilizationtechnology.com/training.htm](http://www.lyophilizationtechnology.com/training.htm) or contact us at [btl@biopharma.co.uk](mailto:btl@biopharma.co.uk).



# About the course

## Course programme

### Day 1

0900	Course Welcome & Introduction
0915	Introduction to Freeze Drying Technology:- Definitions and basics and overview
1000	Product Freezing:- Ice structure, cooling rates and glass transition / eutectic behaviour
1040	Morning Refreshment Break
1100	Primary Drying:- Vapour migration and sublimation
1145	General Concepts of Formulation:- Excipients and protectants and solute behaviour
1230	Lunch Break
1330	Formulation Characterisation 1 - FD Microscopy:- Determination of collapse temperatures
1400	Formulation Characterisation 2 - Thermal & Other Methods:- DSC, MTDSC, DTA and others
1445	Afternoon Refreshment Break
1500	Temperature Measurement:- Product & equipment temperature measurement methods and equipment
1540	Containers and Stoppers:- Types, benefits and drawbacks
1620	Critical Review of Freeze-Dried Materials—a Hands-On Workshop

### Day 2

0900	Secondary Drying and Endpoint Determination Methods:- Concepts and
0930	Cycle Design, Scale-up and PAT
1020	Morning Refreshment Break
1040	Freeze Dried Product Analysis:- Focusing on moisture content & thermal analysis
1140	Freeze-Drying of Proteins - Intro and Case Studies:- Stabilisation issues and the role of excipients
1220	Lunch Break
1320	Practical Session in BTL Laboratory Including demonstration of FDM, Zsinφ, DTA instruments, freeze-dryers and moisture analysers.

Please note timetable shown is an example and may be subject to change.

## About Biopharma Technology Ltd

BTL has assisted in the development of more than 500 freeze-dried products including small and large molecules and whole organisms. In our dedicated freeze-drying laboratory we also use two specialist analytical instruments that we have developed in-house, the *Lyostat2* freeze drying microscope and *Lyotherm2* DTA / Impedance analyser. These enable us to tackle freeze drying problems scientifically, characterising formulations in terms of thermal properties as well as specific lyophilization-related parameters such as collapse temperatures.

## About the course leader

Dr Kevin Ward has run BTL since 2000 and is currently Director of R&D. Following a degree in Applied Chemistry he was awarded a PhD for studies in pharmaceutical freeze drying. He then worked in the pharmaceutical industry as a research fellow in vaccine development before joining BTL. He is the current chair of the Pharmaceutical and Healthcare Sciences Society (PHSS) group on freeze-drying and is a regular guest lecturer at the University of London and University of Wolverhampton.

# Course details and booking form

**Dates:** 23rd-24th November 2010

**Location:** Biopharma House, Winnall Valley Road, Winchester, SO23 0LD, UK

Please note that the cost of accommodation is not covered by the course fees. Details of travel and local hotels will be mailed to you with your confirmation for you to make your own booking.

**Fees: £850**

**Academic Discount:** A lower fee is available for the academic sector. Please enquire for further details. (*proof of academic status is required.*)

**Early Bird Discount:** When booking and payment is made before 19th October, a reduced fee of **£750** is available.

Fees include morning and afternoon tea/coffee, lunch and full lecture notes.

Name		
Job Title		
Organisation		
Address		
Invoice Address (if different)		
Phone		
Fax		
Email		
Please reserve	<input type="text"/>	places

Fax to: +44 1962 841147 or book online at [www.lyophilizationtechnology.com/application.htm](http://www.lyophilizationtechnology.com/application.htm)

Payment must be made in full 2 weeks before the start of the course. Payment by BACS, cheque, Visa or Mastercard is acceptable. An invoice will be issued on receipt of booking.

Multiple registration from the same company or organisation will attract a discount, please contact us for details.

Cancellation in writing before 19th October will incur a service charge of 30% of the applicable fee. No refunds can be made for cancellation after this date. Substitutes will be accepted at any time.

For information on more upcoming courses, visit our website [www.LyophilizationTechnology.com](http://www.LyophilizationTechnology.com).

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