

Freeze Drying Technology and Development of Freeze Drying Cycles

Our service ...

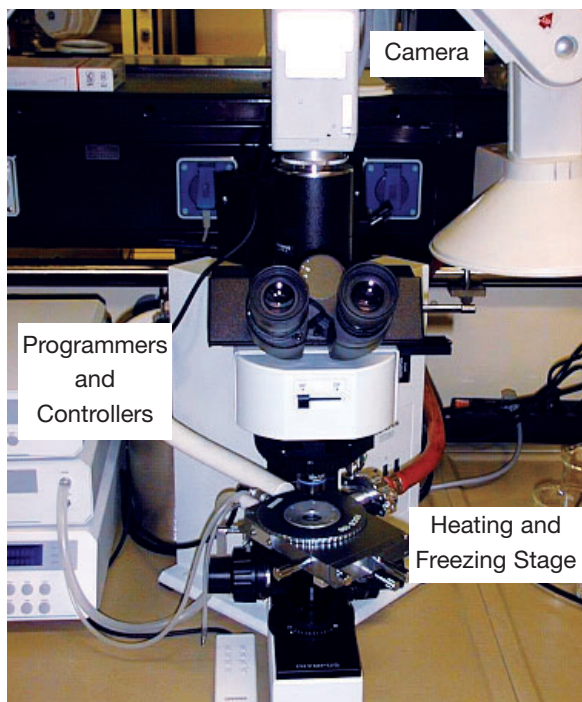
Bayer Technology Services' team of freeze drying experts offers a full range of services for the development of optimal freeze drying processes.

This includes the fundamental steps of characterization and identification of parameters, e.g.:

- the determination of product characteristics using
 - the eutecticum monitor;
 - the cryomicroscope;
 - DSC measurement;
- measurement of the
 - freezing temperature T_g ;
 - eutectic crystallization temperature T_x ;
 - eutectic melting temperature T_{eu} ;
 - glass transition temperature T_g' ;
 - collapse temperature T_c .

We also have the necessary equipment and experience for:

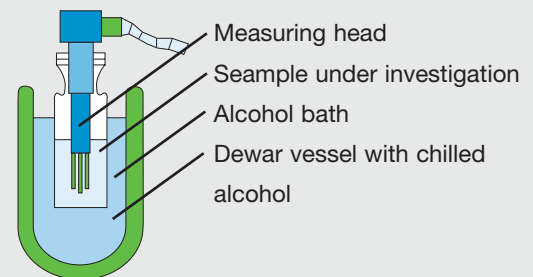
- thermal treatment (during the freezing process);
- development and testing of freeze drying cycles;
- consultancy and customer training.



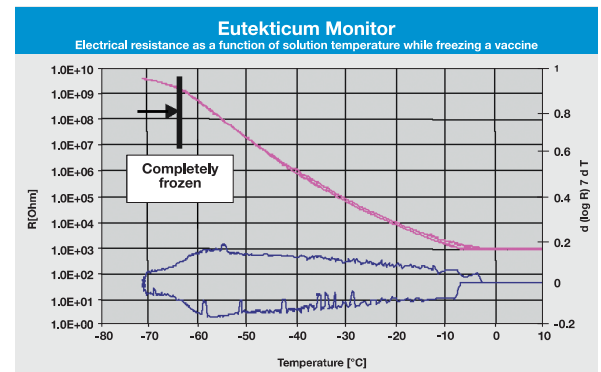
Cryomicroscope for investigating structures



Schematic of a chilling unit



The eutecticum monitor (shown schematically) measures the behavior of formulations as they are frozen and heated.



... is your gain.

We provide you with a freeze drying solution tailored to your product. The high technical standard and round-the-clock availability of our equipment enable us to serve you promptly and reliably.

Furthermore, the product-specific design of optimal freeze drying cycles results in time savings, increased yield and improved product quality.

The results of our measurements provide you with a quantitative and reliable basis for your investment decisions. And as an independent partner with solid knowledge of the market, we can also advise you with regard to optimal plant technology.





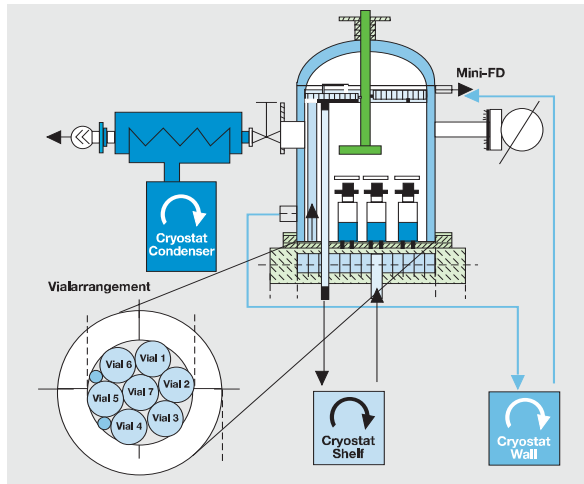
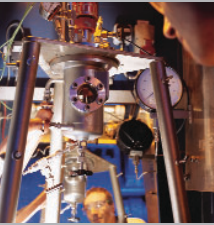
You also benefit from our innovations in this field, from the development of new processes and the refinement of existing processes.

Our approach

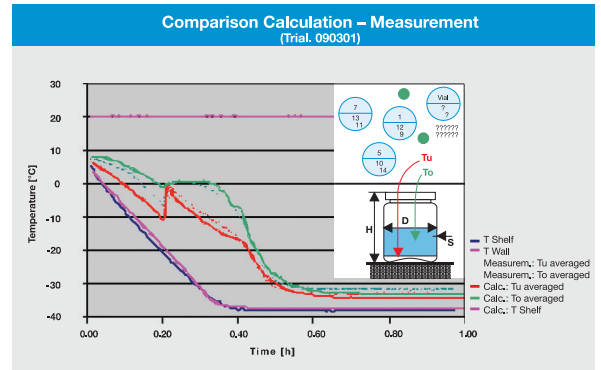
We have available a newly developed miniature freeze drier with which all of the parameters relevant to freeze drying, namely:

- shelf temperature;
 - wall temperature;
 - condenser temperature;
 - system pressure
- can be varied independently.

We are able to achieve more accurate and efficient scale-up using simulations as the basis for predictive calculation of the freeze drying of vials. The calculation is based on the apparatus properties (system dynamics) of the freeze drier to be used.



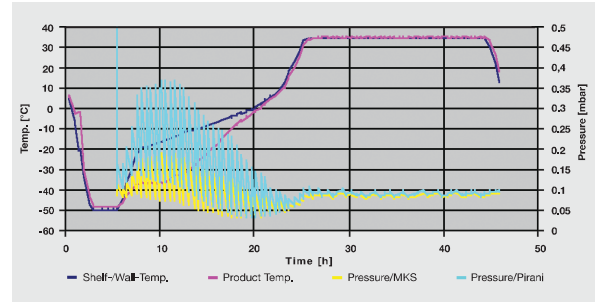
Miniature freeze drier for the investigation of system properties



Analysis of a measured temperature curve with the help of the simulation program "FreezeDry". The comparison of the calculated and the measured product temperatures is used to check whether the heat transfer from the shelf to the vial was calculated correctly.

References

- Development of freeze drying cycles for Bayer HealthCare/Animal Health
- Troubleshooting for Bayer HealthCare – Operations



Spot measurement of the increase in pressure during freeze drying as a measure of drying progress and the basis for the computation of the product temperature curve during the primary drying phase

Contact

Phone: +49-214-30-80900 • Fax: +49-214-30-9662530 • E-mail: info@bayertechnology.com
www.bayertechnology.com