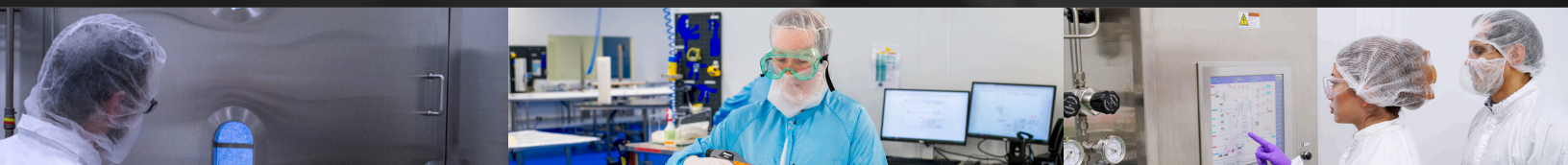




INNOVATE, OPTIMIZE, SUCCEED

ABEC'S PROCESS SCIENCES



ABEC'S PROCESS SCIENCES

INNOVATE, OPTIMIZE AND SUCCEED –
WITH ABEC'S PROCESS SCIENCES



Accelerate Process Optimization

ABEC's Process Sciences group shortens process troubleshooting time and ensures rapid process transfer or scale-up without compromising quality or consistency. Our expertise helps you move from development to production efficiently, minimizing delays and maximizing reliability.

Key Features:

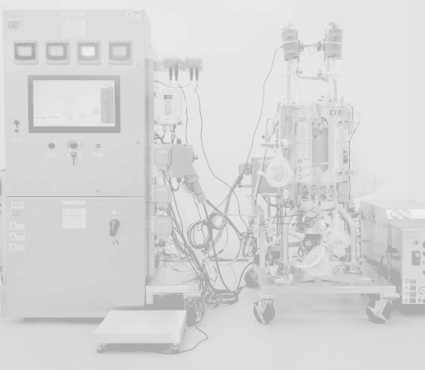
- **Flexible Bioreactor Design:** Options for different geometries, impeller type, aspect ratio and sparger design tailored to your process needs.
- **Process Requirements:** We balance critical parameters like kLa, tip speed, blend time, CO2 stripping, and shear threshold to meet your specific goals.
- **Avoid Common Pitfalls:** Our team helps you avoid issues such as vortexing, staging/mixing errors, and impeller flooding.
- **Expertise Across Cell Types:** Whether working with microbial or animal cell cultures, we understand the unique challenges and optimize accordingly.

Improve Yield and Productivity

Our integrated approach combines advanced modeling and demonstration equipment, empowering you to experiment, overcome challenges, and innovate processes for higher yield and productivity—all while maintaining regulatory compliance.

Key Features:

- **Faster Proliferation:** Strategies for improved cell growth and yield.
- **Mixing Tests & Live Culture Validation:** Real-world mixing tests (50L to 6000L) and live cell/microbial test runs, combined with CFD studies, ensure robust process performance.
- **Quality by Design:** Supporting your Quality by Design activities with thorough process characterization and confirmation runs.
- **Comprehensive Tool Kit:** Access to computational modeling, CFD, FEA, and demonstration equipment for both animal cell culture and microbial fermentation.



Reduce Costs

By leveraging Computational Fluid Dynamics (CFD), we simulate real-world conditions—temperature, pH, oxygen levels, nutrients, agitation, and mixing speed—to reduce process development time and costs. Our approach helps you avoid the pitfalls of off-the-shelf equipment and ensures your process is supported by custom-designed solutions.

Key Features:

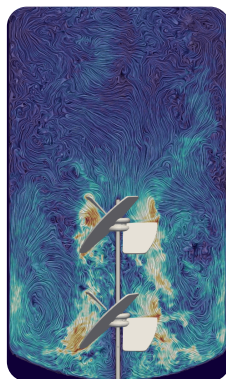
- **Custom Equipment Design:** We design equipment to overcome any process challenge, avoiding the limitations of generic solutions.
- **CFD Capabilities:** Advanced modeling of blend time, vortexing, agitator power, shear, flow fields, bubble dynamics, and mass transfer for optimal process outcomes.
- **Streamlined Process Development:** Minimize the number of runs, reduce time and cost, and de-risk technology implementation and tech transfer.



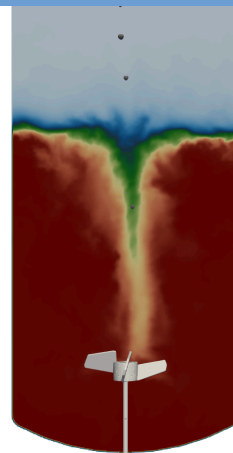
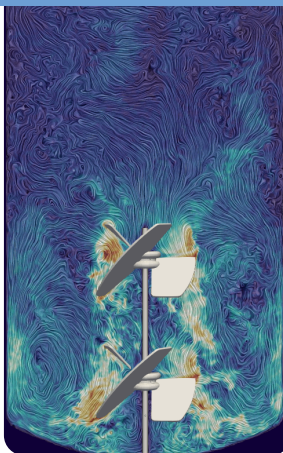
TECHNOLOGY TRANSFER AND BIOREACTOR DESIGN



Mixing Lab

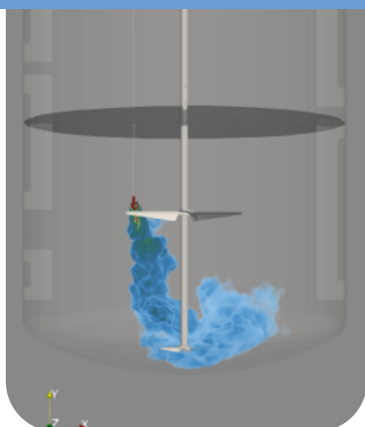


Bioreactor Scale-Up

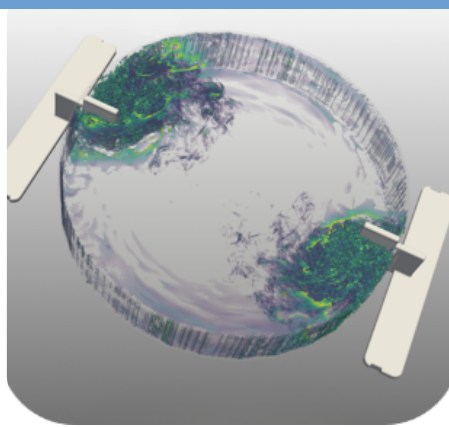


Mixer Design

CFD-AIDED VESSEL DESIGN



Blending



Shear and Energy Dissipation

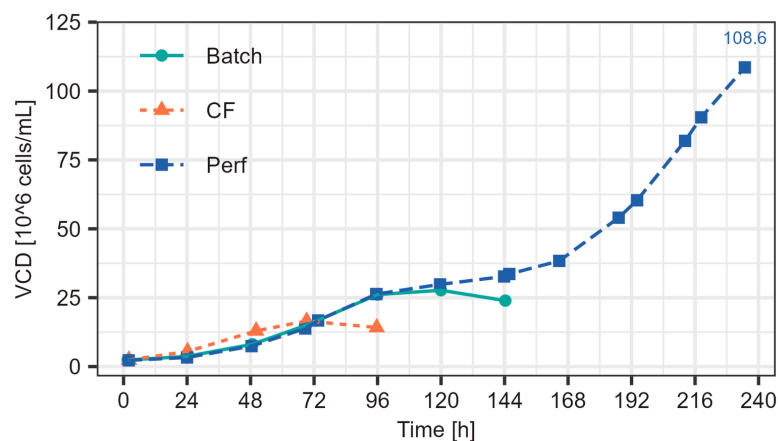


Mass Transfer

CELL TRIALS AND MEDIA CHALLENGE



Cell and Media Trials



Process Development

Since 1974, ABEC has been a leader in delivering engineered process solutions and services for manufacturing in the biotech industry. The majority of the world's pharmaceutical and biotech companies are ABEC customers; with many of today's leading therapies manufactured by processes and equipment engineered, manufactured, installed and serviced by ABEC. ABEC's unique value is based on long experience, complete in-house capabilities, a custom, flexible approach, and long-term credibility. Whether adding capacity or improving existing facilities, ABEC's turn-key solutions and support reduce overall cost and time to market while delivering maximum productivity.

To learn more about ABEC, visit abec.com or email info@abec.com.



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