



Powering results in upstream mAb process scale up

Improving upstream productivity from seed to production

In many mAb production facilities, upstream capacity is constrained not by bioreactor size but by seed train duration, vessel availability, and multi-step handling, which extend timelines and occupy cleanroom space. At the same time, increasing demand cannot be met by adding bioreactors alone due to footprint and cost constraints.

The objective is to increase output per batch while reducing manufacturing complexity. By reducing seed duration and increasing inoculation density, the process shifts from step-limited expansion to productivity-driven production within the existing footprint.

Intensification of upstream bioprocessing approaches reduce process steps, manual handling, and time to production*

Conventional

- Multi-step seed trains
- Manual handling
- Long timelines

Intensification with Thermo Fisher Scientific

- ✓ Fewer processing steps
- ✓ Closed and automated operations
- ✓ Faster progression to production

When implemented together, seed and production intensification strategies can support efforts to increase output and reduce facility burden*



Up to **163%**
increase in titer



~**50% reduction**
in cost per gram



~**20% reduction**
in USP footprint

***Results from intensified upstream process economic modelling:
Optimizing monoclonal antibody production: high-yield upstream process intensification strategies**

Upstream workflow at a glance



Our integrated solutions for upstream process intensification.

High-density cell banking (HDCB)

Thermo Scientific™ Labtainer™ Pro Bioprocess Container with BioTitan Retention Device

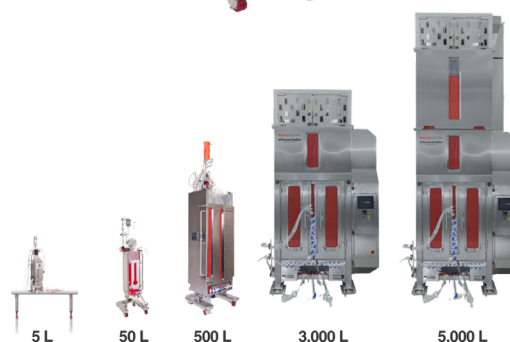
Enables direct HDCB N-2 inoculation to seed bioreactor, eliminates shake flask steps and reduces manual handling and seed process time as much as 50%*.



Scalable production

Thermo Scientific™ Dynadriver™ Single-Use Bioreactors (S.U.B.s) platform from 5 L to 5000 L

Geometric alignment and high turndown ratios enable scalable and automatable intensified seed and intensified fed-batch processes within existing production footprints.



Intensified fed-batch process

Thermo Scientific™ Gibco™ CHOvantage™ cell line with Thermo Scientific™ Gibco™ Efficient-Pro™ Media and Feed Systems

Optimized CHO-based production platform helps to increase monoclonal antibody yield in standard and intensified fed-batch.



Supporting technologies across the upstream workflow

Components that support consistent and scalable upstream performance:



Learn more at thermofisher.com/mAbs

***Disclaimer:** The data shown here represents an illustrative example of how an intensified mAb process differs from a standard mAb process. The process data, modeled using BioSolve Process™ software, show how Thermo Fisher Scientific's bioprocessing technologies can help demonstrate the value of process intensification in both upstream and downstream workflows. Economic modeling is based on representative industry assumptions, including production scale (e.g., 6 x 2000 L bioreactors), facility utilization (~80%), and standard cost inputs (e.g., labor, capital, and pricing), unless otherwise noted. For more information on the study parameters, please read [Optimizing monoclonal antibody production: high-yield upstream process intensification strategies](#). Results are based on lab-generated data (up to 500 L scale) and modeled case studies and are proved for illustrative purposes only. Actual customer results may vary depending on process design, scale, and site-specific conditions.

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