



Powering results in downstream mAb process intensification and scale-up

When purification defines downstream process throughput and cost

As upstream productivity increases, purification costs and capacity often define the new bottleneck. Higher product loads increase pressure on capture chromatography, polishing capacity, and buffer preparation. Purification can become the dominant constraint due to high costs of resins, increasing buffer volumes, and facility footprint limitations.



The challenge is to maintain throughput and product quality while controlling cost and process complexity.

Conventional purification workflows:

- Standard Protein A resins with higher cost per cycle
- Large buffer volumes prepared and stored on-site
- Traditional polishing steps with limited optimization
- Increasing footprint driven by buffer and equipment needs

Intensified purification workflow:

- ✓ Cost-efficient Protein A resin with high performance
- ✓ Inline dilution (ILD) enabling use of buffer concentrates
- ✓ Optimized polishing strategy
- ✓ Integrated system reducing footprint and buffer demand

When implemented together, downstream intensification strategies have the potential to help increase output while reducing facility burden*.



Up to 95% yield
in capture step



~79% reduction
in buffer volumes



~30% reduction
in DSP footprint

***Results from intensified downstream process economic modelling**
[Enhancing monoclonal antibody production: advanced downstream purification strategies](#)

Downstream workflow at a glance



Our integrated solutions offer choices for efficient downstream impurity burden reduction.

Robust capture

Thermo Scientific™ MabCaptureC™ Protein A Resin

- High binding capacity (~50 g/L) and >95% yield
- Enables cost-efficient capture even at high load densities
- Robust performance across multiple cycles

Integrated chromatography solution

Polishing strategy with Thermo Scientific™ POROS™ polishing resins

- High capacity anion exchange **AEX** step for initial impurity reduction
- Flow-through hydrophobic interaction chromatography **HIC** for challenging impurity clearance and improved process economics
- High-resolution cation exchange **CEX** with predictable scalability for traditional mAb polishing

Polishing solution

Inline dilution with Thermo Scientific™ DynaChrom™ Single-Use Chromatography system

- Enables use of concentrated buffers (up to 10X) reducing storage requirements
- Decreases footprint associated with buffer preparation and handling
- Supports scalable and consistent chromatography operation



Supporting technologies across the downstream workflow

Components that support consistent and scalable downstream 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 [Enhancing monoclonal antibody production: advanced downstream purification 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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