



Reimagine scalability in bioprocessing

The DynaDrive Single-Use Bioreactor (S.U.B.)

Upstream bioproduction has experienced substantial movement toward single-use systems. This has been driven primarily by the need to reduce contamination risk and cleaning requirements when compared to stainless steel systems, and to allow for a faster changeover of equipment between batches. At the same time, bioprocess manufacturing operations have matured significantly, and intensification of cell culture processes has pushed the limits of legacy single-use bioreactor systems.

With the continued focus on large-scale monoclonal antibody production and the tremendous growth of gene therapies and viral vector vaccines, companies are exploring how to scale manufacturing processes efficiently. Designed to meet the evolving needs of the biopharmaceutical industry, the Thermo Scientific™ DynaDrive™ Single-Use Bioreactor (S.U.B.) offers exceptional scalability, performance, and reliability. Enabling scale-up from research and development to full-scale production, **DynaDrive S.U.B.s provide the flexibility and efficiency required to streamline your processes and help you achieve your goals.**

Scale easily and efficiently

The DynaDrive S.U.B. family is engineered for scalability.

With a range of working volumes from 1 L to 5,000 L, these bioreactors help ensure consistent performance across all scales. The innovative design allows for easy transition between different volumes, reducing the time and cost associated with scale-up. Whether you are conducting small-scale experiments or large-scale manufacturing, DynaDrive S.U.B.s offer the versatility to adapt to your needs.



Key features:

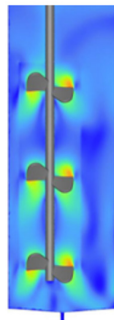
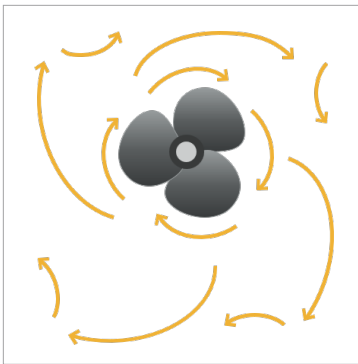
- **High turndown ratios**
 - 5:1 for the 5 L model
 - 10:1 for the 50 L model
 - 12.5:1 for the 3,000 L model
 - 20:1 for the 500 and 5,000 L models
- **A wide range of working volumes**
 - Working volumes available from 1 L to 5,000 L
- **Consistent performance**
 - Uniform mixing and oxygen transfer rates across all scales helps maximize cell density to support fed-batch and perfusion processes
- **Ease of scale-up**
 - Consistent design principles across different sizes (aspect ratio, modified elephant ear impeller, product contact materials)
 - Consistent automation strategy with proprietary software
 - Drill-hole sparger technology
- **A leading single-use manufacturing network for reliable BPC sourcing**

Greater productivity with increased flexibility

DynaDrive S.U.B.s are designed to deliver exceptional performance, helping to ensure optimal cell growth and productivity. The advanced mixing technology and efficient mass transfer capabilities provide a stable environment for cell cultures, leading to higher yields and improved product quality. The robust design minimizes contamination risks and ensures reliable operation, making DynaDrive bioreactors an ideal choice for high-performance bioprocessing.



The flexible drive train includes multiple impellers that enable more PIV while still maintaining reasonable RPM and tip speeds.



Key features:

- **Advanced mixing technology**—helps ensure uniform distribution of nutrients and gases
- **Efficient oxygen transfer**—optimizes cell growth and productivity
- **Robust design**—helps minimize contamination risks and helps ensure reliable operation
- **Consistent film contact layer**—Thermo Scientific™ Aegis™ 5-14 film is used across the bioprocess, both upstream and downstream

DynaDrive bioreactors feature up to 5 impellers and an off-center cuboid design. This shape produces natural baffling effects, improving the mixing performance. The impeller design limits vortex formation and enables disrupted flow patterns.

The DynaDrive S.U.B. brings an outstanding level of performance to single-use bioprocessing. It can decrease the cost of production by up to 25% through a reduction in equipment, materials, consumables, and labor.* The increased reactor size lowers the number of production batches required for a given volumetric demand.

Economic modeling has shown that the DynaDrive bioreactor provides both a lower average cost per gram and reduced the overall cost of investment up to scales of 4,300 kilograms per year of production. It is one of the largest single-use offerings in the market and is backed by the Thermo Fisher Scientific reputation for excellence.

* In comparison to other 5,000 L single-use bioreactors.



High-quality bioprocess containers

Thermo Scientific™ BioProcess Containers (BPCs) are ready-to-use, single-use flexible container systems common for critical sterile liquid-handling applications in the biopharmaceutical industry.

The BPCs for the DynaDrive S.U.B. are available with proprietary Aegis5-14 film. This film is widely used today by many global biopharmaceutical companies for all bioprocessing steps and processes, from bioreactors to media and mixers.

Key features:

- The latest sensor technology in single-use or autoclavable probes, including:
 - **pH sensors**—electrochemical single-use or reusable probes, and optical single-use sensor
 - **Percent oxygen (pO₂) sensors**—optical single-use or reusable probes
 - **Foam**—single-use foam sensor built into the BPC
 - **Capacitance**—single-use sensor or reusable probe
 - **Raman analysis**—optical probe port built into the BPC
- Optional ports for alternating tangential flow (ATF) or tangential flow filtration (TFF)
- A built-in condenser system for 3,000 L and 5,000 L BPCs, which helps extend life and reduce the quantity of exhaust filters needed



- Utilization of crossflow sparging technology to help ensure proper headspace gas mixing during low-volume seed or terminal cell cultures

All sizes of the DynaDrive S.U.B. include a vertical door that provide ample space for BPC loading. The doors have been carefully designed so all probe ports and tubing line sets are positioned correctly and easily without the need to be put through constraint holes. The hardware design allows for consistent and uniform BPC loading, all at ground level, for ease of use and improved ergonomics.



Consistent automation and control

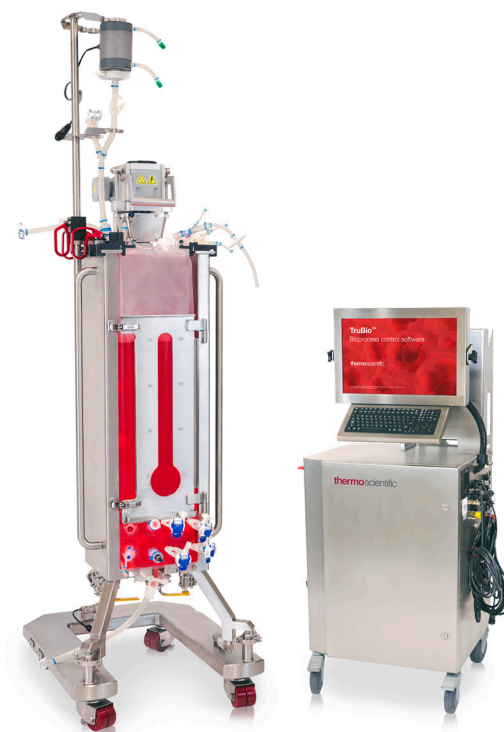
DynaDrive S.U.B.s integrate with Thermo Scientific™ TruBio™ software, powered by the Emerson™ DeltaV™ Live control platform and Thermo Scientific™ HyPerforma™ G3 bioprocess controllers, to provide unified and seamless data aggregation and quality control, improving the user experience.

With digital scaling tools, robust data packages equipped with integrated hardware, and TruBio software integration, the DeltaV Live platform is perfect for scalable and streamlined data flow from clinical through production phases.

These advanced control systems provide precise monitoring and regulation of bioprocess parameters, helping ensure optimal conditions for cell growth and productivity.

Key features of TruBio software when integrated with the DynaDrive S.U.B. include:

- Integration with the widely trusted DeltaV Live automation platform
- Fully scalable control from R&D to production
- Intuitive design, improved configuration options, and advanced data visualization
- Simplified calibration with easy vessel setup
- Validated for GMP



Service and support



Thermo Fisher Scientific offers comprehensive services and support to help ensure the success of your bioprocessing operations. Our team offers installation, maintenance, and technical support, helping you maximize the performance and reliability of your DynaDrive bioreactors.

With our global network of service centers, you can count on timely and efficient assistance whenever you need it. With a long history of maintaining a trusted bioreactor supply relationship measured by validation success, our technical professionals and continued support provide the reliability and flexibility needed to meet your needs, regardless of scale.

Key features:

- **Installation and maintenance**—expert services to help ensure optimal performance
- **Technical support**—comprehensive assistance for troubleshooting and optimization
- **A global service network**—timely and efficient support worldwide

The DynaDrive family of S.U.B.s can help your organization achieve scalable, high-performance bioprocessing. With advanced technology, high-quality consumables, consistent automation, and comprehensive support, the DynaDrive bioreactors provide the reliability and efficiency needed to drive your biopharmaceutical production forward.

Experience performance at scale at thermofisher.com/dynadrive

thermo scientific

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