

PROREACT

Fermentation Systems

Frings



Flexible, Modular Lab- and Pilot-Scale Bioreactor for Research and Production

Characteristics:

- ✓ Basic module with increased performance compared to benchmark standards
- ✓ Additional modules available for a flexible mini plant
- ✓ Freely programmable multi-loop automation software
 - ✓ Design according to strict sanitary standards
 - ✓ Excellent mass transfer and mixing performance
- ✓ Optional integration of up-/downstream processing

Products for Biotechnology



PROREACT Fermentation Systems

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ALCOSENS Module (option)
System for the determination of alcohol (ethanol, methanol,...) or other volatiles for fed batch process optimization. The module consists of a membrane probe, a pressure controller for carrier gas supply and a 19" amplifier card to be implemented into the control system.



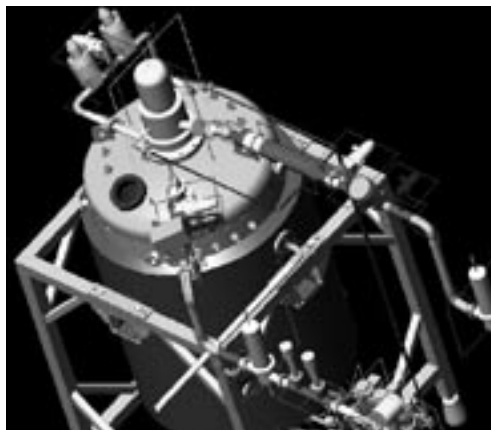
FOAMEX Module (option)
Mechanical Defoamer with unequalled performance. When this centrifugal foam separator is used, no chemical antifoam agent is needed. Increased oxygen transfer rate and biomass activity. Simplified purification and validation. The separator and the control unit are included in the system.



TRG Module (option)
The ideal solution for slightly viscous mediums. The rotor/stator mixing and aeration device provides an oxygen transfer rate about 50% higher than standard rushton impellers. Easy scale-up; therefore, a perfect device also for large-scale bioreactors.

Sizes

The rack-mounted PROREACT system is available from 10 L up to 1500 L**. For larger sizes up to 250,000 L** we offer basic and detail engineering, delivery, installation, training and start up.



** Automation of larger sizes with SIEMENS SIMATIC and PROTOOL/WINCC

Equipment of PROREACT P

Hydraulic unit

- Pressure vessel (up to 6 bar)
- Air inlet control/filtration
- Exhaust gas cooling/filtration
- Drive unit with hygienic seal
- Multi purpose stirrer shaft
- Hydraulic unit for cooling/steaming
- Electrical heating cartridge
- Stainless steel piping and fitting

Pump unit

- Speed controlled substrate pumps
- Fixed speed pumps for acid/caustic soda

Automation and control unit

- Runtime version based on LABVISION
- Sensors and control for T, pH and pO₂
 - Setpoint or profile process controls
 - Integrated calibration routines
 - Configurable sterilization sequence
 - Configurable fermentation sequence
 - Multi graphic data display
 - Analysis functions (trend, integrator..)
 - Data, alarm and event management

Optional modules*

- Freely programmable option of LABVISION
- ALCOSENS alcohol control module
- Head pressure control module
- Weight cell modules
- ...
- TRG mixing/aeration system
- FOAMEX mechanical defoaming module
- Integrated pervaporation module
- Integrated microfiltration module
- ...

*Unlimited number of sensors and modules can be implemented (commercial standard or customized)

Systems for applications with lower sanitary and automation standards



PROREACT B



PROREACT C