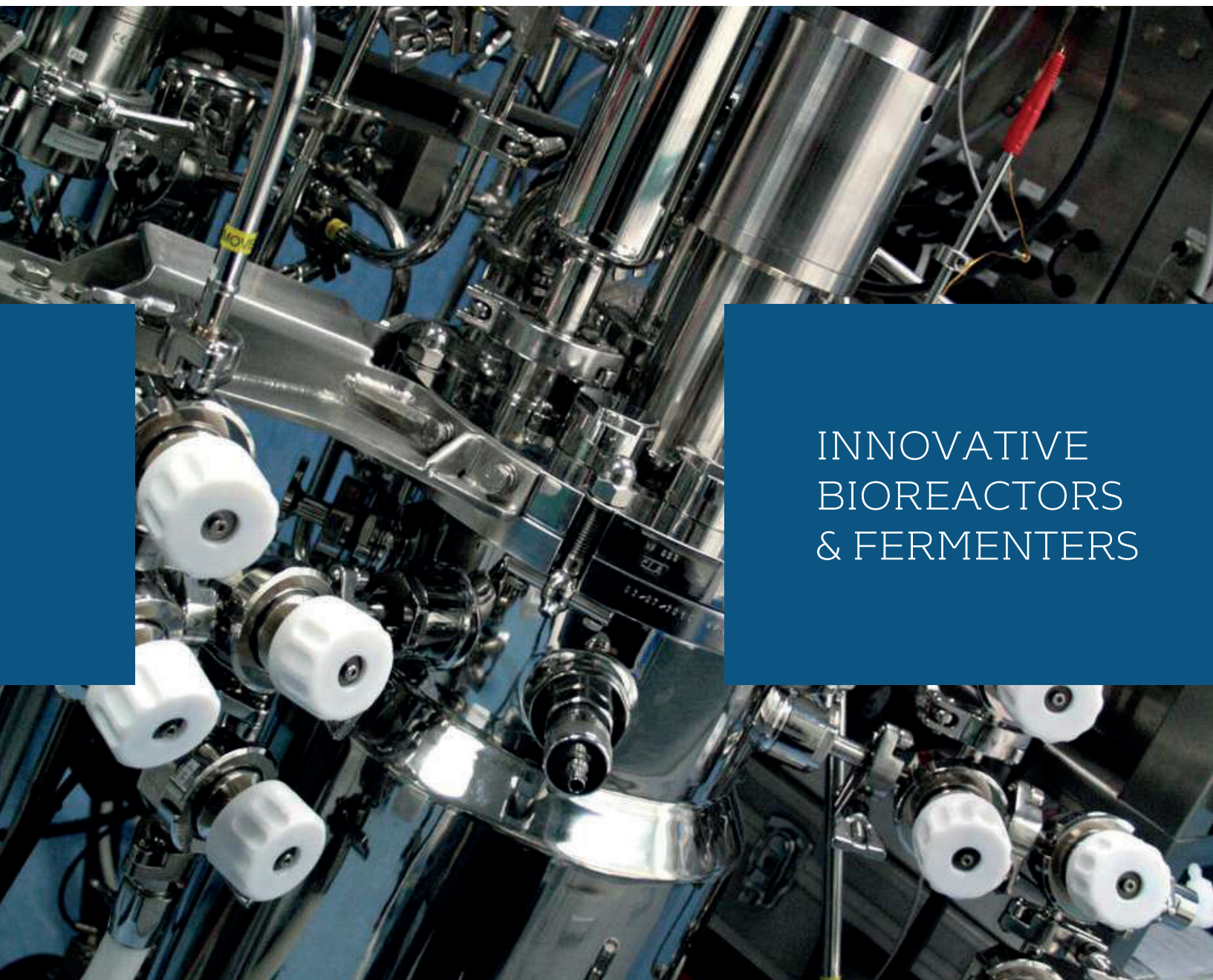


SOLIDABIOTECH.COM



INNOVATIVE  
BIOREACTORS  
& FERMENTERS



## SOLIDA BIOTECH

We are a dynamic company that specialises in engineering, developing, and manufacturing innovative bioprocess equipment.

The company was founded by a management team with over 20 years' experience in the fields of fermentation, cell culture, sterile processing, software and automation technologies, with the aim of meeting the challenges of producing and supplying leading industrial and institutional customers with a new generation of bioreactors and fermenters for research and production, as well as scientific instruments.

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**All our equipment  
meets the standards for  
worldwide distribution.**



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**LABORATORY  
BIOREACTORS**  
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**Water jacketed bioreactors  
from 100ml to 30 litres  
w/v**



**Single wall bioreactors  
with heating blanket and  
cold finger from 50ml to  
30 litres w/v**



**Disposable jacketed and  
single wall bioreactors  
from 250ml to 75 Litres w/v**

## COMPACT BIOREACTOR FOR CELL CULTURE AND FERMENTATION

Compact Bioreactors is a line of latest generation bioreactors that can be used for basic educational applications, but also for advanced bioprocessing and development.

Applications include cell culture, stem cells, fermentation of bacteria, fungus, yeasts, photo-sensitive organisms such as plants and algae and more.

## VOLUMES

Autoclavable vessels: 300 mL, 500 mL, 1-2-3-5-7-10-15-20-30 Litres

SUB Disposable vessels: 250 mL, 500 mL, 1-3-5-7-10-15-20-30-50-75 Litres

## STRONG POINTS

- Its small dimensions, which take up small footprint in the lab
- A Control Unit with the latest generation, powerful and reliable PLC - 'Programmable Logic Controller'
- An HMI-PC digital control interface that supports the functions of a normal PC Touch control with a 15.6" wide screen
- Bioflex™ Software included in the standard management, supervision, and data acquisition package. No additional external data recording and data processing devices are required

## FLEXIBILITY

The Compact line allows you to alternate over 30 types of autoclavable vessels from 50mL up to 30L volumes in single and / or double wall versions and also Disposable Bioreactors from 250ml to 75 w/v.

## ALL-IN

The Compact Bioreactor supports standard 4 fixed and/or variable peristals pumps, 4 flowmeters and/or Massflow controllers, sensors for PH, PO<sub>2</sub>, Temperature, Level, Foam, Biomass, Gas Analyser, Glucose Analyser and more.

Powerful mechanical and/or magnetic mixing system with variable range from 0 to 2000 rpm for liquid, semi-solid and solid bioprocesses.

## SPACE RESTRICTION

Compact is one of the most compact bioreactors on the market, occupying a truly reduced space of 280x400mm WxD to meet the needs of any lab.

## RICH CONNECTIVITY

Another winning element of the Compact unit is its industrial connectivity with PCs and external networks, in addition to modern portable devices such as iPads and mobile phones via real-time Ethernet and USB data communication ports.

## ADVANTAGES

- Simplicity of installation, programming and maintenance
- Accuracy and reliability
- Certified for GLP and GMP classified environments
- Integrated temperature compensation
- Compact design
- HMI-PC with Integrated Data Management and Data Acquisition Software
- IP66 protection class
- SensorFlash® - full-feature functionality with removable memory (Micro SD Card)
- Saving of operative data on non-volatile memory

The only utility connections you need to operate the Compact Bioreactor are electricity and gas supply.

## BIOFLEX™ SOFTWARE

The entire bioreactor system is driven by BIOFLEX™ software, with an intelligent interface that is easily accessible, even for beginners. Thanks to the intuitive user interface, Bioflex is simple to operate, with reduced operator errors and reduced training needs. Bioflex software can be installed on a laptop PC, tablet or smartphone, and enables you to monitor and control your bioreactor at any time: in the laboratory, in the office or even at home.





**Single, Twin, Quad and Parallel configuration with interchangeable re-usable and single-use vessels from 50ml to 75 litres. Industrial connectivity portable modules**

## ADVANCED MODULAR BIOREACTOR

Our advanced modular bioreactor series represents the latest advancements in automation, software and mechanical engineering applied to the bioprocess industry. Industrial standard technologies, high-flexibility, modularity, easy upgrades and replacements, guaranteed long-term spare part availability and after-sales service distinguish our modular bioreactors from the competition.

### SMART DESIGN

The modularity and flexibility of our control unit offer you the unique advantage of being able to start with 1 bioreactor that can then be upgraded to 2-4-6-12-24 and up to 36 bioreactors working online with the same or different vessel size and typology.

### FEATURES

- BioController module with industry leading PLC hardware, ModBus and Ethernet communication protocols to simplify and accelerate single and parallel bioreactor operations
- Enhanced sensors capability integrating Online Biomass and Gas Analyzers, Automated samplers, HPLC, Mass Spec and others
- Gas mixing module supports 4-8 or more integrated massflow controllers per vessel, automated gas control strategy for cell culture or fermentation applications
- Peristaltic pump module with 4-8 or more fix and variable programmable pumps per vessel with bi-direction flow for high precision dosing
- Thermo module with built-in Chiller in a water saving closed loop. Accurate temperature control for single wall and water jacketed bioreactors

## VOLUMES

Autoclavable vessels: 300 mL, 500 mL, 1-2-3-5-7-10-15-20-30 Litres

SUB Disposable vessels: 250 mL, 500 mL, 1-3-5-7-10-15-20-30-50-75 Litres

## DECISIVE ADVANTAGES

The powerful modular controller allows you to interchange different types of autoclavable vessels from 50 mL to 30 litres, Disposable from 250 mL to 75 litres w/v, and SIP stainless steel from 1 litre to 100 litres w/v.

Each module (controller, gas mixing, pumps, thermo loop) can be upgraded, exchanged and replaced at any time without the need for an expert technician.

The communication between the various modules via fieldbus. This industrial measuring technique allows the measured values to be provided quickly and securely to the central controller that automates the machine.

The system also offers great benefits in terms of the reliability of the machine and fast installation.

A modern operating concept with Bioflex Advanced SCADA Software.

Each Advanced system features an innovative web server, which not only allows the system status and measurement data to be displayed, but the command and configuration at the same time as well.

The user can also rely on another big advantage: since the user interface is web-based, no additional software is required. All that is needed is a normal PC or laptop with an installed browser. In this way, mobile applications and remote control commands can also be implemented, reducing start-up and maintenance times and, as a result, costs.

The modular Controller's key aspects are:

- **Expandability of individual modules for managing from 1 to 36 bioreactors in parallel**
- **Interchangeability of modules, easy testing of modules**
- **Simplified interfaces through which the modules communicate with each other**
- **Minimum waiting times for replacement and/or maintenance.**



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**Solida's parallel system has a unique characteristic that enables you to interchange re-usable and disposable single-use vessels from 50 ml to 75 litres.**

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**Market-leading master controller technology for advanced data-logging and embedded monitoring applications.**

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**Unlimited series I/O modules for custom analogue input, analogue output, digital I/O, counter/timer, and CAN measurement and logging system.**

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**Modules are available for a variety of sensor measurements.**

## PARALLEL BIOREACTOR AUTOCLAVABLE & DISPOSABLE

Solida Biotech parallel bioreactors offer advanced controller functionalities designed to meet demanding requirements in both research and process development, as well as for media optimisation and screening studies.

A wide choice of interchangeable Autoclavable and Disposable vessels from 50mL to 75 Litres volume. Our newly engineered control system takes many of our well-proven design features into a new era, offering unprecedented benefits to process development laboratories around the world, including unrivalled capabilities for downscale and upscale modelling of various culture processes and the provision of new levels of power and flexibility.

The PARALLEL system features a POWERFUL master control tower with satellite Module for pumps, gas mixing, temperature control and chillers. Thanks to its high flexibility the parallel system can be configured with up to 36 bioreactors, each providing independent control of the applicable culture vessel.





# SUPERIOR PERFORMANCE

Built-in optical pH and dissolved oxygen sensors for improved accuracy and durability.

Integrated MFCS massflow controllers for cell culture and microbial fermentation strategies.

Variable speed pumps with bi-directional flow for precise addition of liquids.

Magnetic coupler guarantees absolutely contamination free cultures.

The modular design of our systems offers flexible solutions for bioprocess developments with mammalian, insect and human cells, as well as stem cells and microbial cultures at a laboratory scale.

Our parallel systems are characterised by parallel operations, accurate controls, and comprehensive information management.

They support the seamless integration of external analysers (PAT), control units and software.

Superior BIOFLEX™ control software supports sophisticated process control, comprehensive data and information management and Design of Experiments (DoE).

Integrated measurement of online sensors such as biomass, optical density, gas analyser, glucose analyser, alcohol analyser, pCO<sub>2</sub> analyser, HPLCs, auto sampler and others.

Immediate module replacement with zero downtime.

Online maintenance service and support with remote diagnostics.



# MINI BIOREACTOR

Solida Biotech introduce a new range of mini bioreactors for scale down and screening studies in fermentation and cell cultivation.

Different configurations and set-ups on small volumes are available to reduce material and consumable costs to improve development results at a lower scale

Mini bioreactors are used to generate more data, saving time and money. Our systems are engineered to be easy to use and upgradable at any time.

The flexibility and scalability of the BIO-BENCH MODULAR controller platform can manage up to 36 mini bioreactors online.

Controller functionalities and architecture is the same from mini bioreactor to pilot scale, offering our customers more uniformity, simplicity and confidence in use.



## FEATURES

- Up to 36 mini bioreactors controlled online via a unique HMI interface
- Up to 8 variable or fixed speed autoclavable peristaltic pumps per vessel
- Up to 8 mass flow controllers or rotameters per vessel
- Microbial and cell culture configuration
- Single wall and jacketed glass vessels
- Re-usable and disposable single use vessels
- Accurate and independent temperature control per vessel
- PLC automation with HMI human interface touch screen
- Fully controlled parameters include pH, pO<sub>2</sub>, temperature, foam/level, speed, biomass, gas analysis and other
- Batch, fed-batch, perfusion and continuous cultivation
- Stainless steel head plate and auxiliary ports for sensors, septum, sparger aeration (L -sparger or porous sparger), multiple liquid inlets, sample pipe, exhaust condenser
- Mechanical or magnetic stirrers up to 2000 rpm speed with height adjustable impellers (Rushton, Marine, Pitched blade impellers)
- Spare connection for biomass monitor, gas analyser, pCO<sub>2</sub>, methanol analyzer and others
- Intelligent pH and DO probes with self diagnostics
- BIOFLEX™ SCADA software for up to 36 mini bioreactors or more online

## VOLUMES

- 1000 mL total volume, 200 mL - 800 mL working volume
- 500 mL total volume, 100 mL - 400 mL working volume
- 300 mL total volume, 50 mL - 250 mL working volume

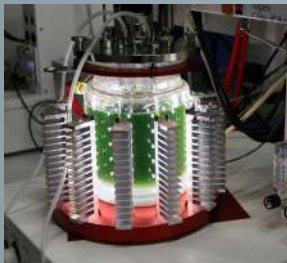
# PHOTO BIOREACTOR

Solida Biotech PBR (Photobioreactor) systems are devices that can contain and grow algae, cyanobacteria and other photosynthetic organisms under heterotrophic and mixotrophic conditions.

The PBR is a controllable environment in which to grow algae, where the supply of light, nutrients, carbon dioxide, air, and temperature can be controlled and regulated.

It is a totally enclosed system with several major advantages as the bioreactor can prevent contamination (from other algae species and bugs), and allows easier cultivation of one algae strain. It also offers better control over a range of other growing conditions, like the pH, light, carbon dioxide and temperature.

In addition to this, a closed system reduces evaporative water losses, and has lower carbon dioxide losses, which all lead to higher cell concentrations. In other words, there are more grams of algae produced per litre of water.



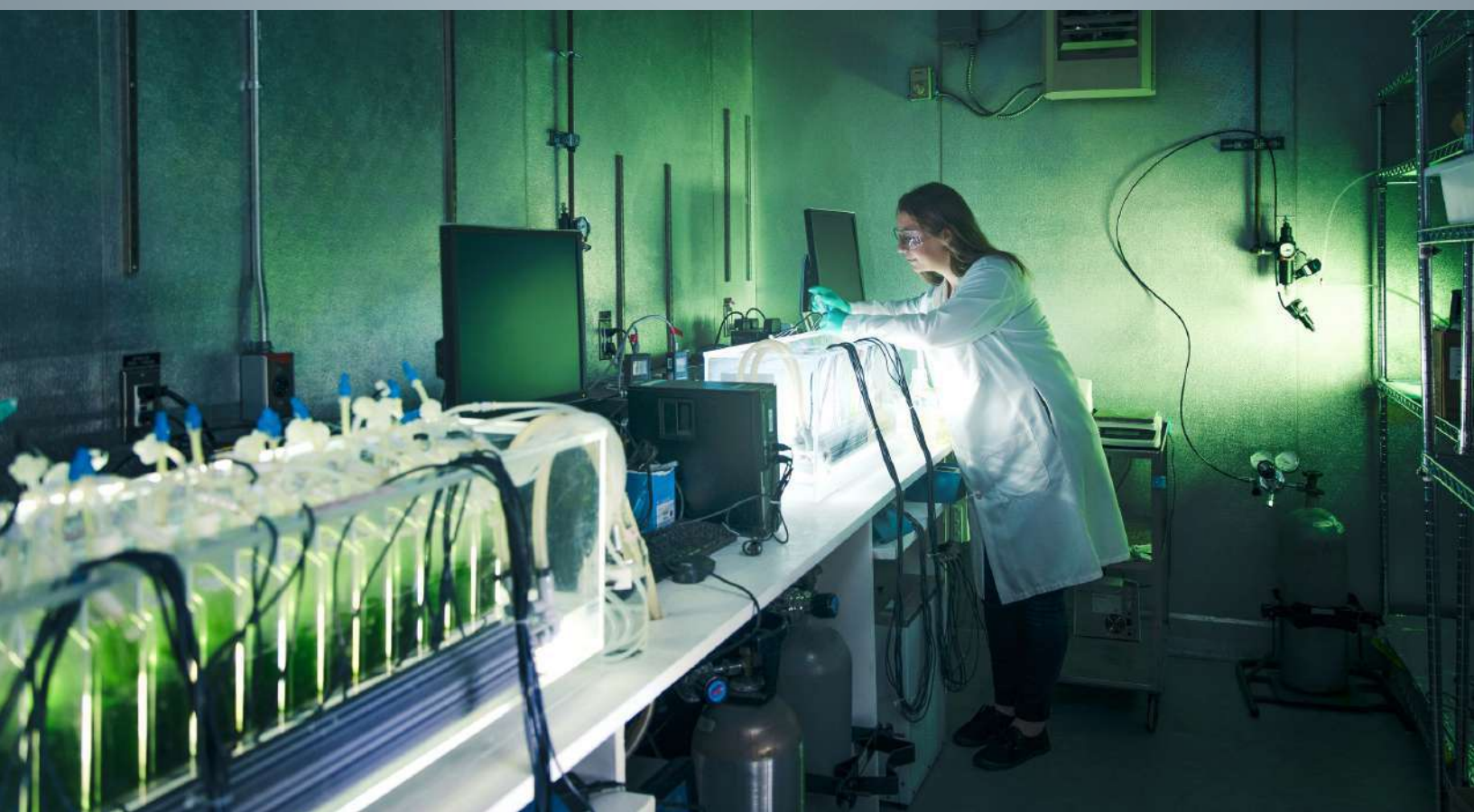
Solida photobioreactors are suited for research and production applications such as:

- product optimisation
- scale up/scale down studies
- PBR optimisation
- continuous cultures
- perfusion systems
- industrial production

Solida PBR are available in three different configurations:

- ROUND TYPE: versatile configuration for multipurpose applications: including algae, plant cells, light dependant cells, bacteria, yeasts, cell cultivation
- AIR LIFT: suitable for algae cultures, biogas and bacterial fermentation
- FLAT PANEL: optimal set-up for light penetration and absorbance for algae, plants and light dependant cells

Solida PBR are available in standard and custom fit volumes starting from 1 litre up to 100 litres for research and pilot production. Open field and large scale PBR are also available on request.



# AIR LIFT / GAS LIFT REACTORS

Air-lift reactors are widely used in the chemical and biochemical process industries as efficient contactors for mass and heat transfer. Their main advantages are low shear rate, high capacity, good mixing, absence of mechanical agitators and they are ergonomic.

Solida Biotech have applied their experience to the geometry of air lift / gas lift reactors to improve hydrodynamic variables like gas velocity and physical properties of the fluids. In fact, the geometry of a reactor has a strong influence on the hydrodynamics and this factor is a source of difficulty in comparing different results.

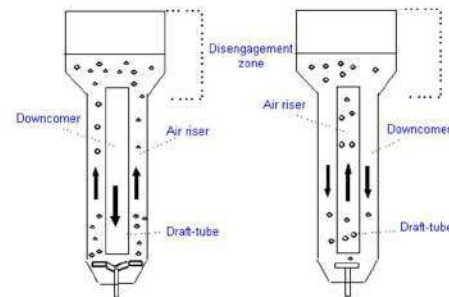
Solida Air Lift design solution offers advantages in gas hold-up, liquid circulating velocity, heat transfer, mass transfer and dispersion coefficients.

Our air lift reactors use sparged air to gently circulate cells and growth media without damaging them. Some cell lines are so fragile in culture that any type of mechanical impeller will shear them.

Our air lift reactors have been designed specifically for culturing mammalian cells, but also bacteriological cells and algae and photosynthetic organisms.

Gentle mixing is guaranteed, numerous head plate ports for various fittings and sampling devices, with many other well-thought out design features that give you valuable benefits.

## Airlift bioreactor



AIR LIFT VOLUMES  
1-3-5-7-10-15-20-30-50 Litres and custom



## MODULAR LABORATORY SIP BIOREACTORS & FERMENTERS

The modularity concept has been extended to our lab/pilot SIP in-situ sterilisable bioreactors and fermenters with leading industrial hardware and software technologies, modular and compact designs; available as pre-assembled SIP bioreactor packages or custom-made solutions based on detailed customer requirements.

The major advantage of the modularity of Solida's bioreactors is the ability to integrate and replace any module at any time and to interchange a wide range of culture vessels in bacteriological or cell cultivation configurations in 1, 3, 5, 7, 10, 15, 20, 30, 40 and 50 litre volumes.

The BIO-SIP Lab range is a direct upscaling of the BIO-BENCH series of lab scale autoclavable bioreactors. Consistent controller and software platforms simplify upscaling and minimise the risk in transferring processes to the next level.

The contained footprint minimises space utilisation in the lab. All systems are fully documented for GLP and cGMP usage and are supplied with an extensive package of documentation to support validation.

## APPLICATIONS INCLUDE

- Lab-scale fermentation of aerobic and anaerobic bacteria, yeast, and fungi
- Cell culture of mammalian, insect and human cell lines
- Stem cell culture, vaccine, monoclonal antibody
- Renewable energies, biofuel/biopolymer R&D.

## FEATURES

- Industrial design for easier upscaling and technology transfer
- PLC industry standard controller combined with a unique modular design for greater flexibility and expandability
- Leading master controller with interchangeable vessels from 1 litre to 50 litre volume
- Parallel bioreactors operations with powerful superior BIOFLEX™ control software supports sophisticated process control, comprehensive data and information management and design of experiments (DoE)
- Advanced process development built around Quality by Design (QbD) standards.



A wide-angle photograph of an industrial facility, likely a pharmaceutical or food processing plant. The scene is filled with a complex network of stainless steel pipes, valves, and large cylindrical tanks. In the background, several large purple tanks are visible. A worker in a white lab coat and hard hat stands in the middle ground, holding a clipboard and looking towards the equipment. The floor is light-colored with yellow safety lines. The overall atmosphere is clean and professional.

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**INDUSTRIAL  
SYSTEMS**  
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## SIP/CIP PILOT BIOREACTORS & FERMENTERS

Solida Biotech supplies a range of standardised & customised Pilot Bioreactors & Fermenters for your microbial culture needs - bacterial or yeast as well as cell culture from 20 L to 500 Litres w/v.

We are specialists in the manufacture of automation, software and vessels for the pharmaceutical and biotech industries. We have a solution for all your bioprocessing/fermentation needs because we understand bioreactors and the processes required to manufacture pharmaceuticals according to strict cGMP guidelines.

Solida is a single-source supplier of modular systems and solutions to meet the needs of any pharmaceutical, microbial or cell fermentation process. The company has the expertise and industry knowledge to help customers test processes and make the right choice of equipment to ensure the security of outcome and the fastest time to market.

## FEATURES

- Pilot scale culture vessels are available in bacteriological or cell cultivation configurations in the following sizes: 20, 30, 40, 50, 70, 80, 100, 130, 150, 200, 250, 300, 400 and 500 litre volume w/v
- Leading industry components for automation, electronics, sensors, valves and gas mixing, among others, offer quality without compromise
- Piping module design eliminates casual operator contact
- Powerful SCADA software to simultaneously manage multiple bioreactors
- Fully automatic in-situ sterilisation with integrated steam generator
- Integrated or external CIP in place cleaning system
- Modular design and interconnectivity with external devices give the possibility of individual solutions.

## APPLICATIONS INCLUDE

- Pilot-scale fermentation of aerobic and anaerobic bacteria, yeasts, and fungi
- Cell culture of mammalian, insect and human cell lines
- Vaccine, monoclonal antibody
- Renewable energies, biofuel/biopolymer production.



## INDUSTRIAL SIP/CIP BIOREACTORS & FERMENTERS

SOLIDA BIOTECH design, engineer and manufacture high quality custom Bioreactors & Fermenters up to 50 cubic metres.

Our portfolio contains a powerful range of engineering and manufacturing solutions that have been integrated to address the process and equipment needs critical to the cell growth process. Our custom solutions meet industry best practice and local regulatory requirements.

In addition, we provide extensive aftermarket service and support, including spare parts, equipment upgrades, servicing and maintenance, and customer training.

## FEATURES

Solida industrial systems are designed and manufactured for easy operation, accessible components and have safety in mind:

Clean steam, sterile gas, and product contact lines are orbitally butt welded to the maximum extent possible.

Our approach to equipment design is to engage in a discussion of detailed project requirements with our customers.

We ensure that our proposal meets the technical process, time to market and commercial requirements for the completion of a successful project.

The main objective of Solida Biotech is to provide our clients with turn-key solutions for the engineering and technical management of their projects so they can achieve the best targets.

Solida Biotech will assist you in procuring and delivering to the production plants all the necessary supplies, equipment, and instrumentation from lab scale to production and final formulation and manufacturing of the products.

## EXPERTISE

- Process engineering (P&ID, functional analysis)
- Mechanical design (vessels and piping – 3D isometric drawings).
- Electrical and control system design, programming
- Piping manufacture and wiring
- Commissioning and after-sales service
- Qualification and Validation (cGMP, GAMP, CFR21 part 11)
- Design Qualification (DQ)
- Installation Qualification (IQ)
- Operational Qualification (OQ)
- Factory Acceptance Test (FAT)
- Site Acceptance Test (SAT)
- Performance Qualification (PQ)





## CUSTOM MADE PROJECTS

In addition to fermentation systems, SOLIDA also supplies apparatus and modules for the production and storage of media, product harvesting, the storage and distribution of highly purified media/clean steam and API formulation.

## TOTAL SUPPLY SKID CONSTRUCTION

Our systems ensure long-term sterility during medium or nutrient change, aseptic sampling, aeration, venting or transfer, highly accurate temperature control, stirrers adapted to provide optimum oxygen transfer rates and cell densities and dead-leg-free design.

## APPLICATIONS

- Microbial and cell cultivation applications from R&D to industrial scale production of vaccines
- Therapeutic proteins
- Monoclonal antibodies
- Ingredients
- Enzymes and biomass
- Blood derivatives (Factors VIII & IX, immunoglobulin, albumin, etc.)
- Immuno-biologicals (Monoclonal Antibodies, Interleukins, Interferon)
- Hormones (Insulin, Growth hormone, etc.)
- Anti-cancer agents
- microbial and viral vaccines.



## HARVEST AND INACTIVATION VESSELS

## MEDIA AND BUFFER PREPARATION VESSELS

Solida Biotech has developed a range of vessels from 1L up to 40 000 L w/v dedicated to the primary recovery process including harvest, inactivation, separation, concentration.

We offer a full line of Biotech process equipment from Research & Development to production:

- Media and buffer preparation vessels
- Inactivation and harvest vessels
- Cleaning in place units
- Control systems
- Turnkey fermentation and cell cultivation suites including Primary Recovery Units.

## FEATURES

- Expertise in design and manufacturing according to the highest requirements and standards such as PED, ASME, BPE and various construction codes (CODAP, ASME, AD-MERKBLAT, BRITISH STANDARD)
- Advanced design and calculation tools including system for full 3D design, SOLID WORKS for mechanical calculations, mixing and cleaning flow models, calculation software
- Large choice of agitation systems to suit any mixing need and product characteristic
- Temperature control, Instrumentation with reliable Sensors, Control Cabinets with leading PLC hardware and SCADA Software
- Excellence in manufacturing: electro-polished finish down to 0.2  $\mu\text{m}$  Ra, controlled Ferrite content, full material and welding traceability
- Quality documentation (Project Quality Plan, manufacturing & inspection file, Factory Acceptance Test protocol) supporting your qualification activities.



## PROCESS & PREPARATION VESSELS FOR LIQUIDS, SEMI-SOLID AND SOLIDS COMPOUNDS

## FORMULATION VESSELS

## STORAGE AND FILLING VESSELS

Solida Biotech is a single source supply of preparation and pressure vessels, to meet the needs of any pharmaceutical, chemical and bio-food company.

Vessels Volume from 1 to 40,000 w/v as well as custom fit solutions.

All vessels can be supplied as stand-alone equipment (stationery or mobile) or as automated process units delivered as fully-functional modules installed on-site that include: agitators; homogenizers; metering and regulating technology; control units; valves and pipe connections. Options for hazardous environments are also available.

## FEATURES

- Vessels made of stainless steel AISI 304, 316, 904 and high-alloy, special realizations are also possible
- Design: Single, double and triple wall design, heatable, insulated
- High quality surface finish:  $\leq 0.2 \mu\text{m}$ ,  $\leq 0.4 \mu\text{m}$ ,  $\leq 0.6 \mu\text{m}$ ,  $\leq 0.8 \mu\text{m}$
- Heating & Cooling with high degree of temperature control from  $-20 \text{ }^\circ\text{C}$  to  $200 \text{ }^\circ\text{C}$
- Agitation with a selection of trustable mechanical mixers and magnetic seals
- All vessels are engineered to ensure effective Clean-in-Place (CIP) and Sterilize-in-Place (SIP)
- Material traceability of vessel parts and components.

## APPLICATIONS

- Preparation vessel for production of highly sterile products
- Buffer preparation vessel for plasma fractionation
- Media preparation for pharmaceutical, chemical and bio-food
- Vessels for dissolution of solid and semi-solid components.



## CLEAN-IN-PLACE (CIP) AND STERILISE-IN- PLACE (SIP) SYSTEMS

Solida Biotech innovative CIP concepts meet comprehensive high standards to guarantee product safety at every point of the process.

We manufacture CIP and SIP systems for cleaning and sterilization of process equipment from 1 Litre to 50.000 Litres nominal capacity.

Clean-in-Place (CIP) and Sterilise-in-Place (SIP) systems are designed to both automate essential cleaning and disinfection processes and remove the need for time-consuming disassembly and assembly work.

The advantages of our CIP systems include :

- reduced cleaning cycle times
- optimised use of detergent and water
- elimination of manual cleaning and contamination risks

Our units provide functionality for CIP/ SIP configurable recipes for water rinses, chemical washes, blow down and air drying, sanitation (heat or chemical), and flow, pressure, concentration and temperature controls.

## FEATURES

- Efficient cleaning solutions for process vessels, bioreactors, fermenters and other equipment for laboratory, pilot and industrial applications
- Integrated or stand-alone skid mounted CIP systems, semi-automated or fully automated
- Automating the cleaning cycle essentially converts batch pharmaceutical processes into a continuous operation of production and cleaning cycles
- Solida Biotech advanced CIP wash unit handles all filtering, preheating, mixing and pumping of water, detergents and demineralised water. It provides continuous monitoring and control of cleaning parameters, including flow rate, detergent concentration, temperature and wash time for full process validation
- All of our CIP units are designed to guarantee successful cleaning. They can be integrated into the single use recovery of cleaning media and single or multi-stream routes, as well as for online and offline cleaning and sanitisation





—  
**BIOPROCESS  
ANALYZERS**  
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## ON-LINE BIOMASS SENSORS

Risk-based stoichiometric process management, quantitative and qualitative multi-parameter process analysis which permits the gain of more process knowledge and safety as well as for TURBIDOSTAT operational mode and feedback control loop.

## ON-LINE MEASUREMENT OF TOTAL CELL DENSITY

The Solida OD-CELL sensor performs online measurement of total cell density in solution. The sensor is based on optical density, which measures the turbidity of the cell suspension. The measurement is made at NIR (near-infrared) wavelengths so it is insensitive to changes in media colour.

All particles and molecules that absorb or scatter light at 880 nm will be detected, including living and dead cells and cell debris. This measurement is effective after inoculation, when cells are expanding quickly but concentrations are low, making permittivity-based readings less reliable.

Simple online measurement of cell growth  
Reliable values during the growth phase  
Early detection of process deviations

## SPECIFICATIONS

- Sensor length: 120, 225, 325, 425 mm
- Diameter: 25 or 12 mm
- Optical path length: 5 mm
- Wetted parts: 1.4435 stainless steel, sapphire glass, EPDM (FDA approved, USP class VI)
- O-ring material: EPDM (FDA approved, USP class VI)
- Steam sterilisable, maximum temperature 135° C
- Pressure range: 0 - 10 bar (25° C)
- Measuring range: 0 – 2500, equivalent to total cell density of 0.5 to 100 g/L dry weight
- Measuring principal: absorbance
- Wavelength: 880 nm (NIR).

## ON-LINE MEASUREMENT OF VIABLE CELL DENSITY

SOLIDA LIVE-CELL sensor enables real-time, online measurement of viable cells in solution. The measurement is not influenced by changes in the media, microcarriers, dead cells, or debris. Online measurement of viable cells makes it possible to detect events and respond in real time without sampling.

- Increase yield and lower production costs
- Detect changes in cell physiology with frequency scanning
- Precisely control harvesting for continuous culturing
- Early detection of process deviations
- Sensors optimised for multiple conductivity ranges.

The measurement principle is based on capacitance. In an alternating electrical field, viable cells behave like small capacitors. The charge from these small capacitors is measured by the sensor and reported as permittivity (capacitance per area).

## SPECIFICATIONS

- Process connections: DN25 a-length 70 mm (SG), 46 mm (DG), or 54 mm (DG BE)
- and DN12 a-length 120, 220, 320, 420 mm
- Wetted parts: 1.4435 stainless steel, PEEK (FDA approved, USP class VI), Platinum, EPDM (FDA approved, USP class VI)
- O-ring material: EPDM (FDA approved, USP class VI)
- Steam sterilisable, maximum temperature 135° C
- Pressure range: 0 - 3 bar (25° C)
- Measuring range: 0 – 700 pF/cm, equivalent to viable cell density of 5 to 200 g/L dry weight
- Conductivity range standard: 2 – 50 mS/cm; LC: 0.5 – 10 mS/cm; HC: 5 – 100 mS/cm.



## GAS ANALYSER FOR O<sub>2</sub>, CO<sub>2</sub>, ETHANOL, CH<sub>4</sub>, H<sub>2</sub> METHANOL

SOLIDA Biotech offers a wide portfolio of gas analysers for fermenters, shake flasks and also biogas analysis.

The CO<sub>2</sub> / O<sub>2</sub> gas sensor analyses the amount of oxygen uptake and carbon dioxide production in the outlet gas from your bioreactor or fermenter. Real-time monitoring of CO<sub>2</sub> and O<sub>2</sub> is a valuable tool for the measurement of cell growth within your fermenter vessels. Monitoring these changes can improve productivity by indicating the correct rates for oxygen flow and substrate feed. Using our gas analyser you can also calculate respiratory quotient (RQ), oxygen transfer rate (OTR), carbon dioxide transfer rate (CTR), and metabolic rate.

SOLIDA infrared gas analysers can be used to simultaneously measure the concentration of CH<sub>4</sub> and H<sub>2</sub> in sample gases. This is based on the single source two beams non dispersion infrared (NDIR) method for CH<sub>4</sub>, CO<sub>2</sub>, and the fuel cell method (ECD) for H<sub>2</sub>S and O<sub>2</sub>.

The general applications are landfill, anaerobic digestion and other fermentation processes.

### SPECIFICATIONS O<sub>2</sub> SENSOR

Measurement range: 0-25%, 0-50% and 0-100%  
Measuring principle: Zirconia dioxide or Electro chemical  
Concentration range: 0 – 100 Vol.%  
Accuracy (25°C, 1.0 bar): ± 2% FS

### SPECIFICATIONS CO<sub>2</sub> SENSOR

Measurement range: 0 - 10%, 0 - 25%, 0 - 50%  
Measuring principle: Infrared, Dual wavelength  
Concentration range: 0 - 50 Vol.%  
Accuracy: (25°C, 1.0 bar) <0.2% Full Scale (FS) ± 3% of value.

### APPLICATION AREAS

Chemical industry  
Biogas production  
Agriculture  
Algal hydrogen production

## SPECIFICATION ETHANOL/ METHANOL SENSORS

Ethanol-analyser for biofuel and fermentation processes. The SOLIDA EtOH compact analyser detects the concentration of ethanol and/or methanol in the liquid phase of the bioprocess.

Measuring range: 0.2-25 Vol.%\*  
Measuring principle: Infrared, two wavelengths  
Accuracy: < ± 0.2 % full scale ± 3% value

## SPECIFICATIONS CH<sub>4</sub> SENSOR

The sturdy SOLIDA CH<sub>4</sub> series is ideal for monitoring and controlling the production of methane in the biogas plant (methane digester).

Measuring range: 0 - 100%  
Measuring principle: infrared, dual wavelength  
Concentration range: 0 – 100 Vol.%  
Accuracy: 0.2% full scale (FS) ± 3% of value

## SPECIFICATIONS H<sub>2</sub> SENSOR

Hydrogen sensor SOLIDA H<sub>2</sub> for in-situ measuring. The H<sub>2</sub> series of exceedingly robust and reasonably priced hydrogen sensors can easily be directly integrated into the gas lines.

Measuring range: 0 - 100%  
Measuring principle: thermal conductivity detector  
Concentration range: 0 – 100 Vol.%  
Accuracy: 0.2% full scale (FS) ± 3% of value



## MULTI ASSAY METABOLITE

Analysers for bioprocess control and production optimization. Laboratory and industrial production process control requires a fast and accurate analysis of sample to allow optimum operating conditions to be set and maintained. This can apply equally to food and beverage production, pharmaceutical products or biopharmaceutical manufacturing systems for both cell culture and microbial applications. The speed and flexibility of our enzymatic laboratory analysers makes them ideal for quality control purposes. A printed result is obtained typically within 20 - 25 seconds from sample injection. New analytical assays are continually being developed; for example measurement of methanol from dimethyl dicarbonate (DMDC) preservation of juices and other beverages but also NAD and NADH for industrial control purposes.

## OUR ANALYSERS

Offer a simple, fast and flexible method for determination of key parameters in fermentation broths, cell culture media and other microbial applications.

- BIO-GM8 industrial multi assay analyser, 11 assay test menu
- BIO-GL6 industrial multi assay analyser, 5 assay test menu
- BIO-GM10 industrial glucose analyzer, 3 assays.

## BIO-GM8 INDUSTRIAL MULTI ASSAY ANALYSER

Assays include: glucose, lactate, ethanol, methanol, ammonia, glycerol, sucrose, lactose, glutamine and NAD / NADH.

## BIO-GL6 INDUSTRIAL MULTI ASSAY ANALYSER

Assays include: glucose, lactate, ethanol, methanol and glycerol.

## BIO-GM10 INDUSTRIAL GLUCOSE ANALYSER

Assays include: glucose.

## ANALYTICAL PRINCIPLE

In oxidase enzyme reactions, the analyser measures the rate of oxygen uptake under appropriate controlled conditions, this is directly proportional to the concentration of the analyte.







**AUTOMATION  
& SOFTWARE**

## AUTOMATION PLATFORMS

Solida Biotech offers a uniform automation and software platform from laboratory to pilot and production controllers. Our strategic choice allows you to scale up or down from lab to process bioreactors, using the same logic and programming, both simply and directly with no need whatsoever to learn different programs or software interfaces.

All control units in the Solida Biotech bioreactors product range are based on PLC hardware and software. PLC automation solutions are undoubtedly the industry standard, from laboratory to pilot and production scale equipment.

## FEATURES

- PLC technology ensures optimal performance, reliability, long life spans and spare part availability when compared with proprietary systems
- PLCs mean modularity and flexibility and, in this way, harmonising our control unit and software with the vessel concept maximises the possibilities for working with several types of cell lines and microorganisms without the need to modify instrument design
- Ultimate flexibility in a single and parallel bioreactor.

## BIOFLEX SOFTWARE & SCADA

Bioflex supervisory and data acquisition software for remote control laboratory, pilot and industrial bioreactors and fermenters for batch, feed batch and continuous processing.

Bioflex incorporates the latest developments in bioprocess control automation with new features implemented by our R&D team, built on their longstanding experience in fermentation and cell culture technologies.

Bioflex Software is a harmonised platform capable of running lab, pilot or industrial scale bioreactors, while Bioflex has the flexibility and capability to manage and control up to 36 bioreactors online.

## FEATURES

- Management of algorithms and complex control (cascade modes, sequences, profiles, etc)
- Management of culture and manufacturing files
- Management of BATCH recipes
- Programming of control set points according to a profile set by the operator or a previous batch file
- Calculation module allowing the calculation of derived variables
- The software supports a library of culture files containing standard culture conditions for each microorganism
- Operating systems windows 10, 7, XP, Vista.



## DATA MANAGEMENT

Online data collection  
Offline data collection  
Additional drivers available separately  
Data storage system

## SUPERVISORY CONTROL

Programming of time-based actions  
Programming of event based actions  
Profiling of set points  
Manual setting of local control set points

## QUALITY AND VALIDATION

Solida Biotech aims to support the validation process in the following areas:

- Design Qualification (DQ)
- Installation Qualification (IQ)
- Operational Qualification (OQ)
- Factory Acceptance Test (FAT)
- Site Acceptance Test (SAT)
- Performance Qualification (PQ)
- GMP and GAMP compliant documentation
- CFR21 part 11 software.

## SERVICES AND MAINTENANCE

Solida Biotech's quality assurance system ensures accurate technical assistance for bioprocess equipment, supervised by our general management and based on the TÜV-certified, ISO 9001 reference system, which applies to the entire organisation and covers all the company's activities.

Solida Biotech has a worldwide network of subsidiaries, representatives and trained after sales mechanical and electrical systems specialists, and our partners regularly deliver dedicated, in-house training courses to ensure their engineers' skills are appropriate and up-to-date.

All of our local service engineers are fully certified through practical assessments of their abilities and the knowledge gained from in-house courses.

Local stocks of spares and consumables, together with a rapid, 24-hour technical data source, are also critical to our success.

Our colleagues worldwide take their responsibilities very seriously and provide a high level of local technical assistance for bioprocess equipment, covering service, peripherals and upgrades.

We are committed to ensuring our clients receive highly efficient, quality services.



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