

## Engineered Process Plants

The intricacy and scope of many engineering projects are complex enough—don't work with an engineering partner that further complicates the process. Global Antico Process Systems offers the full range of engineering services in-house, which means you always communicate directly with the source so nothing gets lost in translation.

Global Antico Process Systems has an experienced team of chemical engineers and consultants specializing in the design, engineering and commissioning of complete turnkey process plants. The complete range of services is offered right from feasibility studies, basic and detailed engineering to commissioning.

Our experience of working with various materials of construction such as Borosilicate Glass, Stainless Steel, PTFE, fluoropolymer lined components, Hastelloy, Graphite, etc ensures that we design the most optimum and efficient plant.



Some of the process plants offered by Global Antico Process Systems are :

- Sulfuric acid Purification
- Bromine Production / Recovery Plant
- Nitric acid Purification
- Nitric acid Concentration
- Solvent Recovery plants
- Purification of Spent acids
- Purification of natural extracts such as essential oils
- Waste water treatment plants
- De - Nitration plants
- NOx absorption
- Precious metal recovery and refining
- Integrated NAC / SAC
- Exhaust Gas Purification
- HNO<sub>3</sub> Purification

Laboratory - scale plants, demonstration-scale plants, and everything in between—Global Antico Process Systems provides turn-key solutions to help you take new processes and products from concept to commercialization.

## Advanced Flow Reactors (AFR)

Our reactors enable the continuous processing of chemicals with a smaller footprint than conventional batch reactors and are specially designed for the seamless transition from lab feasibility to process development to industrial-scale production of chemicals for the pharmaceutical, fine and specialty chemical industries.

Our Lab Reactor is a metal-free plug and play open system that can seamlessly scale-up with other AFR products, and has a photo reactor option.

### Advanced Flow Reactors (AFR) features

- Plug and play open system including data monitoring
- Ready to start, with thermostat integrated
- Up to 3 liquid lines, 1 gas line and a back pressure regulator for pressure control
- High chemical durability due to a full metal free system
- Outstanding mixing and heat exchange
- Low internal volume
- Seamless scale-up

### Lab Dosing Unit

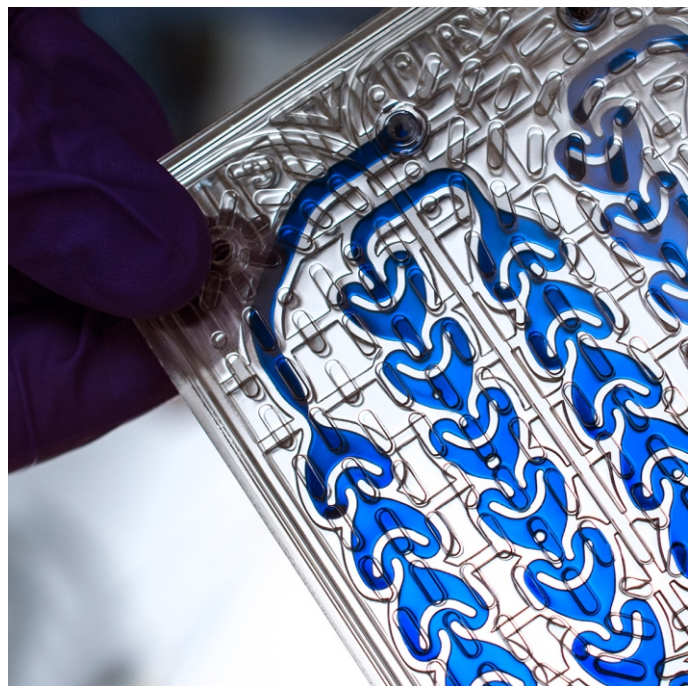
- Plug and play system
- High chemical durability due to full metal free system
- Up to 4 liquid lines including one high precision syringe pump
- 1 gas line with pressure sensor
- Thermostat for reaction temperature control included

### General specifications

Dimensions	:	(L x W x H) 40 x 38 x 45 cm
Pressure	:	Up to 18 barg
Materials	:	Glass, PFA/PTFE, Perfluoroelastomer
Fluidic module size	:	6.1" x 4.9" (155 x 125 mm)
Fluidic module	:	2.7 ml internal volume
Temperature	:	- 40°C to 200°C
Flow rate	:	2 to 10 ml/min

### Lab Photo Reactor Option

- Compatible with the Lab Reactor system
- Tunable LED irradiation source, with 6 different wavelengths
- LED lighting intensity higher than 100 mW/cm<sup>2</sup>
- Efficient light penetration with both sides of glass fluidic module illuminated
- Extended LED lifetime due to efficient liquid cooling
- Wireless control of wavelength selection and intensity





## Continuous Stirred Tank Reactors (CSTR)

A continuous stirred tank reactor (CSTR) is a type of chemical reactor that is widely used in industrial processes to produce chemicals, pharmaceuticals, and other products. In a CSTR, reactants are continuously fed into the reactor vessel, where they are mixed and allowed to react, producing the desired products. The CSTR consists of a large tank or vessel, typically made of borosilicate glass or stainless steel, which is equipped with a stirring mechanism, such as a mechanical stirrer or an agitator, that keeps the reactants in motion and ensures that they are well-mixed. The reactants are introduced into the tank through inlet ports, and the products are continuously removed through outlet ports.

The key feature of a CSTR is its constant stirring, which ensures that the reactants are evenly distributed throughout the vessel and that the reaction proceeds at a uniform rate. This allows for precise control over the reaction conditions, such as temperature, pressure, and concentration, which can be adjusted by controlling the flow rates of the reactants and products.

CSTRs are particularly well-suited for reactions that require high conversion rates or produce intermediate products, as the continuous mixing ensures that the reaction proceeds to completion. They are also commonly used in bioreactors for the cultivation of microorganisms, such as bacteria or yeast, which require constant stirring to ensure optimal growth and metabolic activity.

Overall, CSTRs are a versatile and reliable tool for industrial processes that require continuous, high-volume production of chemicals or other products.

In flow chemistry, a continuous stirred tank reactor (CSTR) equipped with features to continuously feed and exhaust reactants is an example of a mechanically mixed flow reactor.

### General specifications

Reaction Volume	:	50 ml to 100 liters (jacketed glass vessel)
Temperature	:	-60 °C (-90 °C) to +150 °C (200 °C)
Material	:	Borosilicate glass 3.3, Stainless Steel, PTFE

