

# The Gastropod range

## Tube in Tube Reactors



**Fast, efficient and  
controllable gas liquid  
reaction in flow**



# A BREAKTHROUGH IN FLOW CHEMISTRY

◀ Mixing gas and volatile components in batch operations poses dangers, but with the Gastropod, these reactions can now be carried out in continuous flow, offering efficiency, control, and reliability. ▶

For more information and specifications, **[click here](#)**



Available Online

# The Gastropod

## Effortlessly perform gas liquid reactions in flow

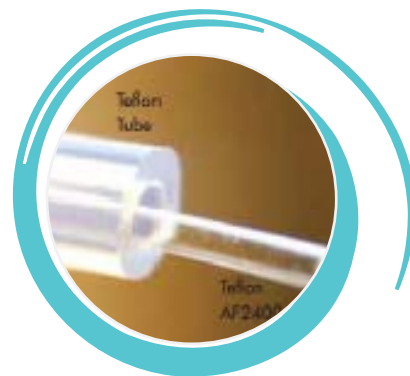
Enhance and expand the reaction capability of your lab by utilising our semi permeable membrane flow reactor. Capable of safely delivering or removing gases into a liquid stream at a variety of pressures and flow rates, the Gastropod allows complete control of your reactions.



Gas Reaction Module (P/N 146770)

Gas-liquid transfer is achieved through diffusion via a gas-permeable membrane tube (AF 2400) placed inside a larger Teflon tube, forming a “Tube-in-a-Tube” configuration that maximizes the transfer area between the two streams.

In collaboration with the world-renowned Ley Research Group at Cambridge University, the groundbreaking Gastropod revolutionizes gas-liquid chemistry with its three versatile configurations! Whether producing a gas-saturated solvent stream, executing seamless gas-liquid continuous reactions, or efficiently stripping gas from a liquid stream - the Gastropod sets a new standard in chemical innovation.



# Gas Introduction Module

In the Gas Introduction Module liquid flows through the inner tube whilst the gas fills the annular area, pre-dissolving the gas into the reagent stream for downstream reactions.

## The system features:

- Rapid generation of a continuous gas-saturated solvent stream.
- Easy operation.
- Customizable tube length and volume.
- Efficient, controllable, and reliable gas dissolution method.
- Compact design suitable for laboratory use.
- Reliable gas stream control with an optional gas manifold, including a pressure gauge and safety burst valve.



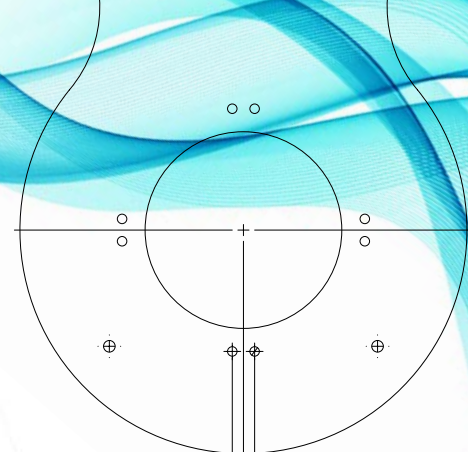
Gas Introduction Module (P/N 25620)

# Gas Reaction Module

Gas fills the permeable inner tube within the Gas Reaction Module with the liquid in the annular area allowing continuous controllable gas liquid reactions to take place.

## Key features of the system include:

- Enables continuous gas-liquid reactions at low volumes with high throughput.
- Accommodates the use of insoluble gases in gas-liquid reactions.
- Efficiently conducts heat to and from the flowing liquid.
- Designed as a compact laboratory unit.
- Easy to operate.
- Provides reliable control of the gas stream.
- Ensures gas supply throughout the entire reactor length with an integrated gas manifold, pressure gauge, and safety burst valve.
- Compatible with the Polar Bear Flow Heating and Cooling Unit for programmable, reliable, and precise temperature control of reactants.



Gas Reaction Module (P/N 146770)

# Degassing Module

The Degassing Module allows liquid to flow through the inner tube whilst a vacuum is pulled in the large annular area drawing any gas out of the liquid.

The system includes the following features:

- A large outer tube that increases the annular area, allowing a greater vacuum to be maintained along the entire tube length.
- Continuous gas extraction from the liquid throughout the full length of the reactor.
- Flexible choice of fittings for vacuum connections (standard 1/4" Barb).
- Compact design suitable for laboratory use.
- Easy to operate.
- Compatible with the Polar Bear Flow Heating and Cooling Unit, providing programmable, reliable, and precise temperature control of reactants.



Degassing Module (P/N 143190)

# Specification Overview

		GAS INTRODUCTION MODULE	GAS REACTION MODULE	DEGASSING MODULE	CUSTOMISATION AVAILABLE
		Including integrated Gas Manifold	Including Gas Manifold		
<b>Part Number</b>		<b>25620</b>	<b>146770</b>	<b>143190</b>	
Maximum Gas pressure	bar	25	25	3	
Flow rate	ml/min	0.1 - 10	0.1 - 10	0.1 - 10	
Dimensions (l, w, h)	cm	33 x 19 x 1	18 x 15 x 7	26 x 16 x 9	
Gas Manifold Dimensions	cm	-	13 x 16 x 15	-	
Weight	kg	2	REACTOR = 0.4 MANIFOLD = 1.25	0.7	
Fittings and Seals		Swagelok	Swagelok	Swagelok	
<b>Outer tube</b>	Material	PFA	PFA	PFA	Yes
Dimensions	mm	OD 3.18 x ID 2.4 x 881	OD 3.18 x ID 2.4 x 942	OD 6.35 x ID 4.76 x 993	Yes
Volume	ml	3.2	3.5	16.8	Yes
Connection Fittings		1/8" Swagelok	1/16" Swagelok	1/4" Barb	Yes
<b>Inner tube</b>	Material	Teflon AF2400	Teflon AF2400	Teflon AF2400	
Dimensions	mm	OD 1.0 x ID 0.8 x 992	OD 1.0 x ID 0.8 x 992	OD 1.0 x ID 0.8 x 1123	Yes
Volume	ml	0.5	0.5	0.6	Yes
Connection Fittings		1/16" Swagelok	1/16" Swagelok	1/16" Swagelok	Yes

# Some Suggested Reactions

The Gastropod has demonstrated versatility across a wide range of applications, including but not limited to:

- Ozonolysis reactions
- Carbonylation reactions
- Hydroformylations, including those utilizing syngas
- Nucleophilic addition of ammonia
- Carboxylation processes
- Heck coupling reactions employing ethylene
- Hydrogenation reactions
- Aerobic anti-Markovnikov oxidative processes
- Glaser oxidative couplings

These diverse applications highlight the system's broad utility in facilitating various gas-liquid reactions in a continuous flow setting.



## ACCESSORIES:

# Gastropod Gas Manifold

Control the pressure and flow of gases with the Gastropod Gas Manifold. The assembly includes two controlling Needle Valves, a Pressure Relief Valve and Pressure Gauge on two manifolds, one the Gastropod tubing inlet and the other for the outlet.

The Gas Manifold can also be used directly with the Gastropod tubing to introduce gases into the ancillary area (outer tube) and liquids into the permeable tubing.

It is compatible with all of the Gastropod modules and can be integrated directly on to the Gas Introduction Module.



GASTROPOD		GAS MANIFOLD
Part number		157020
Materials of construction		316 Stainless Steel
Maximum Gauge indication	bar	30
Relief Valve Cracking Pressure	bar	26 - 27
Connections		Swagelok 1/8" or 1/16"

## ACCESSORIES:

# The Portable Gas Reservoir

The Gastropod Portable Gas Reservoir eliminates the need for large, pressurized gas cylinders in the laboratory. Compatible with both the Gas Introduction and Reaction Modules, the Portable Reservoir is equipped with appropriate gauges, valves, and a safety rupture disc, ensuring the safe and convenient transportation of gases throughout the laboratory environment.



GASTROPOD		PORTABLE GAS RESERVOIR
Part number		29660
Materials of construction		316 Stainless Steel
Volume	mL	150
Maximum Operating Pressure	bar	100
Maximum Gauge indication	bar	130
Relief valve	bar	130
Outlet connection to regulator		Swagelok 1/16"
Outlet Pressure Regulator range	bar	1 to 30

## ACCESSORIES:

# Tubing Kits

Tubing Kits are available, allowing the replacement of all the tubing in each module:

TUBING KIT FOR GAS INTRODUCTION MODULE	TUBING KIT FOR GAS REACTION MODULE	TUBING KIT FOR DEGASSING MODULE
PART No. 32120	PART No. 146780	PART No. 145740
1 x 992mm AF2400 Inner Tube (1mm OD)	1 x 1000mm AF2400 Inner Tube (1mm OD)	1 x 1123mm AF2400 Inner Tube (1mm OD)
1 x 881mm PFA Outer Tube (1/8" OD)	1 x 881mm PFA Outer Tube (1/8" OD)	1 x 881mm PFA Outer Tube (1/4" OD)
2 x 255 PTFE Connection Tubes (1/16" OD)	4 x 1250 PTFE Connection Tubes (1/16" OD)	2 x 1250 PTFE Connection Tubes (1/16" OD)
2 x Thin Wall Needle Inserts	2 x Thin Wall Needle Inserts	2 x Thin Wall Needle Inserts
2 x 1/16" Swagelok Ferrules	4 x 1/16" Swagelok Ferrules	2 x 1/16" Swagelok Ferrules
2 x 1/8" Swagelok Ferrules	2 x 1/8" Swagelok Ferrules	2 x 1/4" Swagelok Ferrules

Lengths of AF2400 tubing, per metre, are also available to purchase separately (P/N 29160)



◀ For more information  
on the Gastropod range  
please get in touch or  
take a look at our website.

EMAIL

[sales@crduk.com](mailto:sales@crduk.com)

WEBSITE

[www.CambridgeReactorDesign.com](http://www.CambridgeReactorDesign.com)

**Cambridge Reactor Design Ltd**

Unit D2 Brookfield Business Centre,  
Cottonham, CB24 8PS  
England, UK

T +44 (0)1954 252522

E [sales@crduk.com](mailto:sales@crduk.com)

W [www.CambridgeReactorDesign.com](http://www.CambridgeReactorDesign.com)



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