



FOAM ANALYZERS

*A Complete Range of Instruments
For Foam Study*

ABOUT FOAM STUDY

Many foaming techniques are used and developed in Industry applications. Therefore, Foam analyzers are frequently used in research, development and quality control for the study of foams.

Our FOAMSCAN™ range of instruments will help you characterize foam properties easily and precisely, saving valuable time and money in formulating of foaming products.

Methodology

Our Instruments can replicate foam generation.



By Gas Injection in a liquid through a Porous glass filter



By Mechanical stirring: mixer, shaker..



By Liquid recirculation



By Depressurization: Sodas, Oil and Gaz...

Our instruments also allow the study of foam produced in external devices by chemical reactions: latex, polyurethane... or by biological reactions: yeasts, bacteria...

Measurements can be carried out:

- at high temperature up to 200°C
- at high pressure up to 100 bar (1.450 psi).

Advanced Software Technology

- Image analysis software measures precisely the volume of foam.
- Liquid fraction and liquid volume are determined in real time from the conductivity electrodes.
- Cell Size Analysis software measures bubbles 'size and distribution over the time.
- Software controls measurement parameters
 - Gas flow rate / Agitation speed
 - Temperature / Pressure

Providing a Complete range of Measurements

All along the experiment

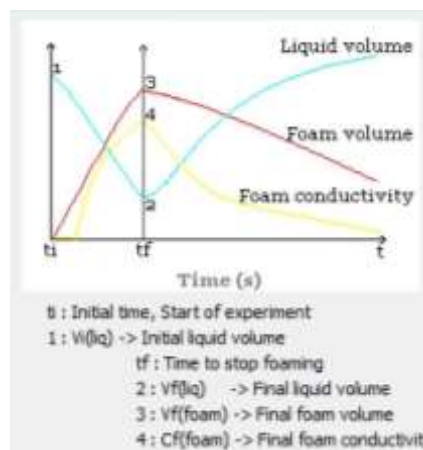
- Volume of foam / liquid
- Liquid fraction (Drainage)
- Foam Density / Stability
- Bubble Size analysis

During the foam formation

- Capacity of Foam
- Index Bikerman

Since end of foaming

- Capacity of Foam
- Index Bikerman
- Expansion coefficient
- Conductance
- Foam maximum density
- Foam stability index



For lots of Applications...

- **Fuel formulation:** Foamability of fuel, defoamer testing.
- **Crude oil:** Foamability by sparging and depressurization, defoamer testing.
- **Cosmetics:** Foam texture depending on liquid fraction and bubble size, foam stability.
- **Sodas, beer, Champagne:** control of foam by depressurization or when pouring a glass.
- **Environment:** Foam study for material extraction from soil, decontaminating foam study.
- **Chemistry:** Anti-Foam for manufacturing products, detergents, solid foam properties (cement).

STANDARD INSTRUMENTS

*designed to characterize Foam properties
depending on Foam generation*

FOAMSCAN™

- Generation by Gas injection: The foam is generated by injecting some gas into the liquid

FOAMSPIN™

- Generation by agitation: The foam is generated by mechanical stirring (direct or indirect)

MINIJET™

- Generation by liquid jet: The foam is generated by the circulation of the liquid

FOAMVIEW

- For Foams and Bubbles generated by an external device

INSTRUMENTS

HIGH TEMPERATURE / HIGH PRESSURE

*designed to characterize Foam
properties in most demanding Applications*

FOAMSCAN™ HTMP

- Designed to measure the ability of a liquid to generate foam by sparging up to 120°C / 8bar

FOAMSCAN™ DEPR

- Designed to measure the ability of a liquid to generate foam by depressurization up to 120°C / 8bar

FOAMSCAN™ HTHP

- Designed to measure the ability of a liquid to generate foam by sparging up to 200°C / 100 bar

...For many Research Applications

PETROLEUM



FOOD



CHEMISTRY



COSMETICS



PHARMACY





STANDARD FOAM ANALYZERS

*designed to characterize Foam properties
depending on Foam Generation*

FOAMSCAN™



Generation by Gas Injection

FOAMSCAN™ is designed to characterize the properties of foams generated by injecting some gas into the liquid through a Porous glass filter . The software controls the gas flow rate and the foam volume is analyzed in real time.

The measuring tube is chosen according to the foams or applications that are studied. The tube can combine the following functionalities:

- Cylindrical single-walled glass tube without conductivity electrodes for foam volume measurement only.
- equipped with conductivity electrodes to measure the liquid fraction of aqueous foams in real time.
- with double glass wall to control the temperature during the foam study (from an optional circulating bath).
- equipped with 4 prisms to adapt to the Cell Size Analysis (CSA) option.

The image analysis software measures precisely the volume of foam in real time whereas liquid fraction and liquid volume are determined from the conductivity electrodes.

The Software controls measurement parameters all along the experiment: Gas flow rate, Temperature. Cell Size Analysis software measures bubbles size and distribution over the time.

FOAMSCAN™ is provided in a protective box that protects from light disturbance when operating experiments and protects the instrument from dust.

FOAMSCAN™ generation by Gas injection can be combined with FOAMSPIN™ generation by stirring, in the same instrument.



Measurements and Data

- | | |
|---|--|
| <ul style="list-style-type: none"> • Foam volume • Liquid volume • Liquid fraction • Gas flow rate • Temperature • Foam conductance | <ul style="list-style-type: none"> • Volume of gas supplied • Foaming capacity • Foam stability • Drainage • Foam density • Bikerman index |
|---|--|

Applications

- Foamability: shampoo, cream, coffee, beer, additives, formulation etc...
- Scientific correlation with sensorial test
- Improve formula and surfactants' screening.

Technical specifications

Gas Flow	100 ml/min ; 500 ml/min ; 1000 ml/min ; 5000 ml/min
Liquid Volume	30-80 ml
Gas	Air, N ₂ , O ₂ , CO ₂ ...
Options	Automatic Cleaning, Size of the bubbles (CSA), Stirring, Sampler

FOAMSPIN™



Generation by Stirring

FOAMSPIN™ is designed to characterize the properties of foams generated by mechanical direct or indirect stirring.

A set of rotating blades produces foam under control of the software. Maximum rotation speed of the blades, 6 000RPM, depends on product viscosity.

The measuring tube is chosen according to the foams or the applications that are studied. The tube can combine the following functionalities:

- Cylindrical single-walled glass tube without conductivity electrodes for foam volume measurement only.
- equipped with conductivity electrodes to measure the liquid fraction of aqueous foams in real time.
- with double glass wall to control the temperature during the foam study (from an optional circulating bath).
- equipped with 4 prisms to adapt to the Cell Size Analysis (CSA) option.

The image analysis software measures precisely the volume of foam in real time whereas liquid fraction and liquid volume are determined from the conductivity electrodes.

The Software controls measurement parameters all along the experiment: Stirring speed, Temperature. Cell Size Analysis software measures bubbles size and distribution over the time.

FOAMSPIN™ is provided in a protective box that protects from light disturbance when operating experiments and protects the instrument from dust.

FOAMSCAN™ generation by Gas injection can be combined with FOAMSPIN™ generation by stirring, in the same instrument.



Measurements and Data

- | | |
|---|---|
| <ul style="list-style-type: none"> • Foam volume • Liquid volume • Liquid fraction • Stirring rate • Temperature • Foam conductance | <ul style="list-style-type: none"> • Foaming capacity • Foam stability • Foam liquid stability • Foam density • Bikerman index |
|---|---|

Applications

- Foamability: shampoo, cream, wine, beer, additives, formulation etc...
- Scientific correlation with sensorial test
- Improve formula and screening surfactant
- Foam generates with shear

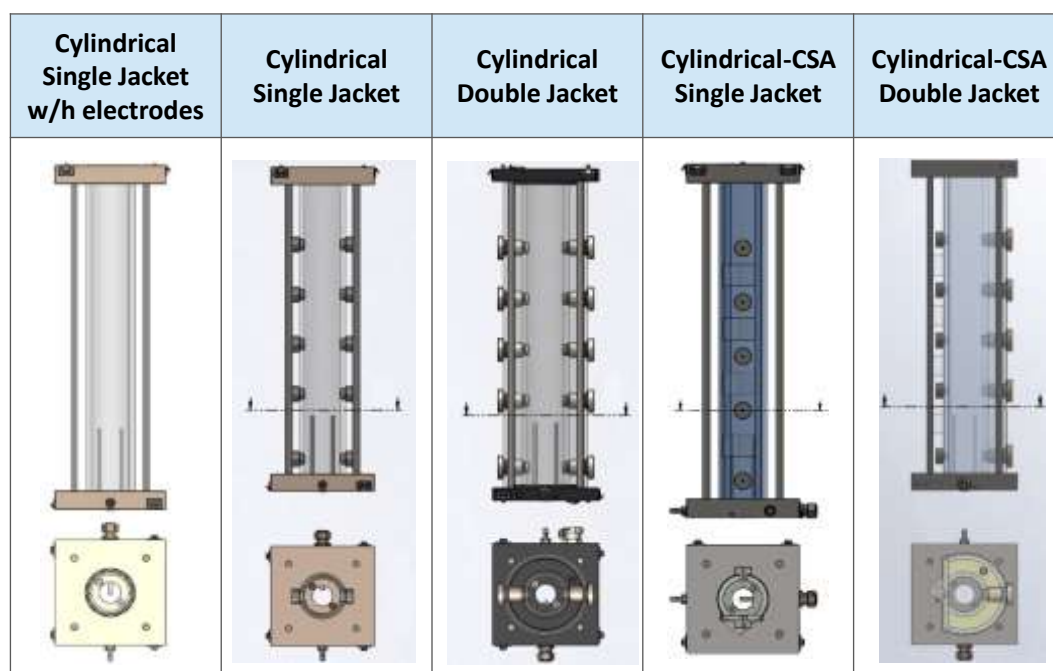
Technical specifications

Stirring rate	500 to 6 000 RPM depends on product viscosity
Liquid volume	90 - 180 ml (indirect) / 80 - 110 ml (Direct)
Options	Automatic Cleaning, Size of the bubbles (CSA), Sparging, Sampler (Automation of the device)

Cylindrical measuring tubes are made of **optical glass to ensure the perfect reproducibility of the foam measurement.**

The tube is chosen according to the foams or the applications that are studied. The tube can combine the following functionalities:

- Cylindrical single-walled glass tube without conductivity electrodes for foam volume measurement only.
- equipped with conductivity electrodes to measure the liquid fraction of aqueous foams in real time.
- with double glass wall to control the temperature during the foam study (from an optional circulating bath).
- equipped with 4 prisms to adapt to the **Cell Size Analysis (CSA) option.**



	Cylindrical Single Jacket w/h electrodes	Cylindrical Single Jacket	Cylindrical Double Jacket	Cylindrical-CSA Single Jacket	Cylindrical-CSA Double Jacket
Shape	Cylindrical			Cylindrical - Prism	
Inside Diameter (mm)	35			35-36	
Jacket	Single/double	Single	Double	Single	Double
Electrodes	No	Yes	Yes	Yes	Yes
CSA option	No	No	No	Yes	Yes
Liquid Fraction / Volume	No	Yes	Yes	Yes	Yes

KLEE: Automatic Cleaning

An automatic cleaning system installed at the top of the tube is controlled by the software. A circulation pump is used to flush the tube.

Automatic cleaning can be programmed before or after the experiments avoiding to disassemble / assemble the apparatus.

CELL SIZE ANALYSIS (CSA)

Camera and software

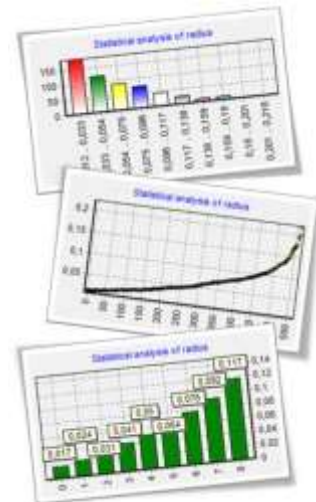
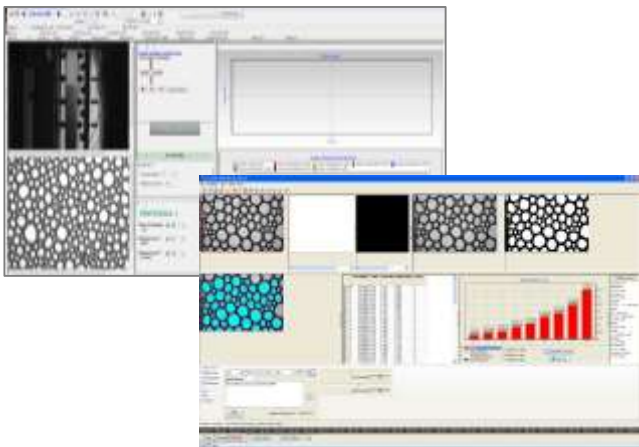
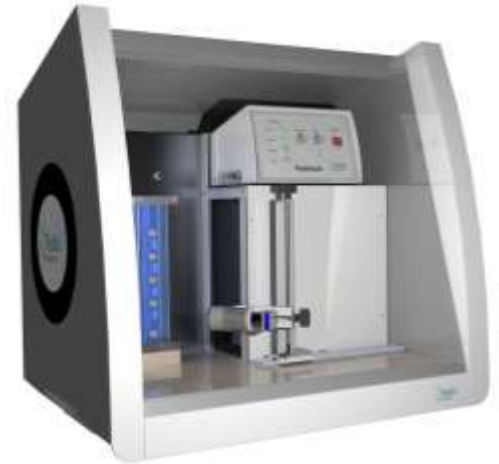
This option includes a second camera focused on one of the four prisms along the tube which delimits the area of foam that will be studied (about 1cm²).

The camera can be moved up and down along the tube to adjust to the foam height and choosing the prism where bubbles will be studied.

The pictures are acquired and stored by the software automatically. The CSA software detects the bubbles automatically and calculates all the selected parameters.

Results are presented in a variety of statistic formats that can be exported in Excel files:

- Frequency histogram of the radius of the bubbles
- Ordered radius of the bubbles from smaller to bigger ones
- Deciles histogram of the radius of the bubbles
- ...



MINIJET™



Generation by Liquid Jet

MINIJET™ is designed to measure the ability of a liquid to generate foam by the circulation of the liquid.

Defoamer and auto-cleaning are integrated in the instrument.

The measuring tube is chosen according to the foams or the applications that are studied. The tube can combine the following functionalities:

- Cylindrical single-walled glass tube without conductivity electrodes.
- Cylindrical double-walled glass tube without conductivity electrodes to control the temperature during the foam study (from an optional circulating bath).

The image analysis software measures precisely the foam volume and the liquid volume in real time. The Software controls measurement parameters all along the experiment: Flow rate of liquid jet, Temperature.

MINIJET™ is provided in a protective box that protects from light disturbance when operating experiments and protects the instrument from dust.



Measurements and Data

- Foam volume
- Liquid volume
- Liquid fraction
- Flow rate of liquid jet
- Temperature

Applications

- All Foams generated by Jet
- Anti-Foam test
- Oil&Gas, Fuel
- Home & personal care

Technical specifications

Flow rate	100 - 1 000 ml/min
Liquid volume	100-200ml
Maximum volume of deformer	1ml

FOAMVIEW

Study of Foams generated externally.

FOAMVIEW is an option to study foams generated externally. Specific measuring tube or cuvette (adapted to FOAMSCAN™ and CSA measurements) are conceived to facilitate the introduction and analysis of foams produced externally (tube shorter than standard one).

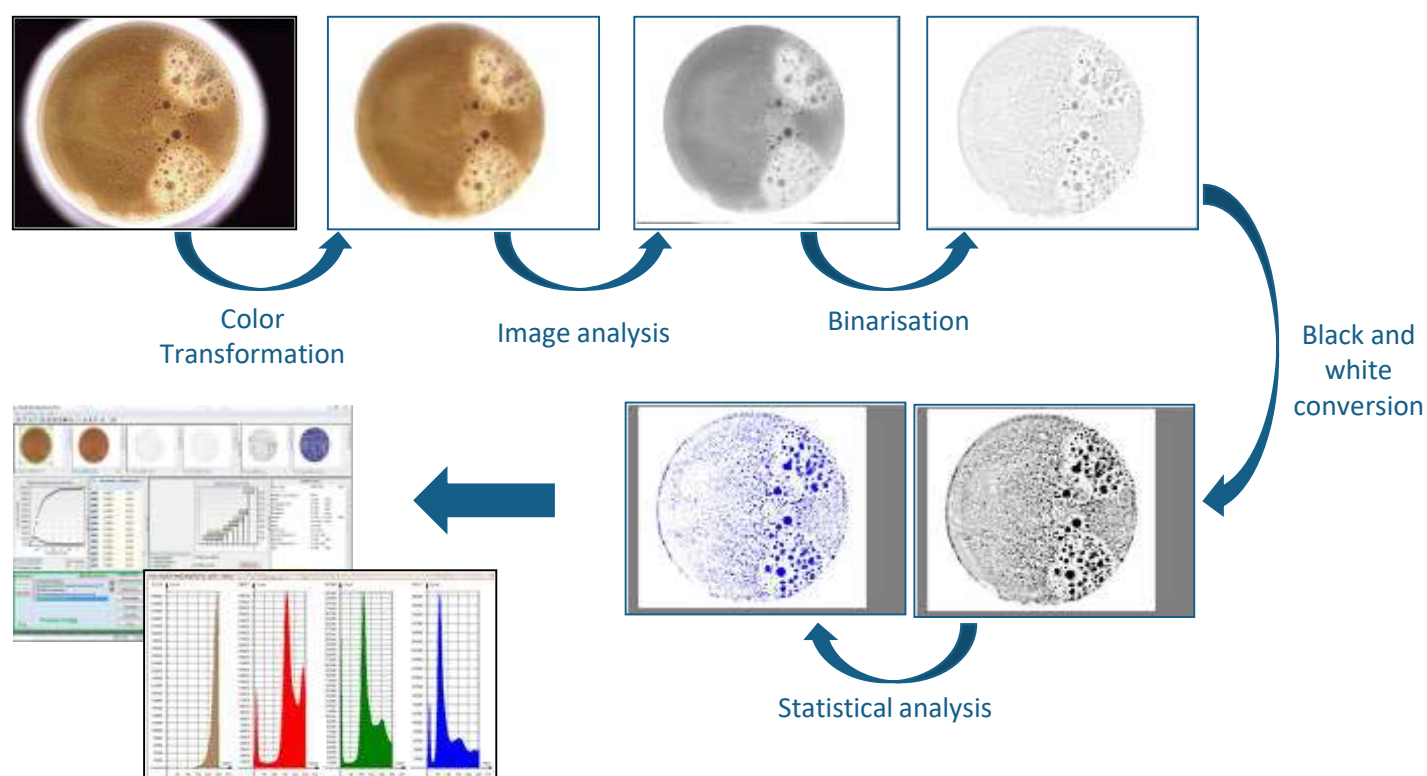
FOAMVIEW software is developed to analyze bubble size and distribution with black /white or colored images.

The pictures can be taken directly or through a prism that define the analysis area. The pictures are acquired and stored by the software. Then, pictures are treated in order to provide black and white images that allow FOAMVIEW software statistical analysis: distribution, size, number, area...

Results are presented in a variety of statistical formats that can be exported in Excel files.

FOAMVIEW can be combined with **FOAMSCAN™**.

Example of Coffee foam analysis



Applications

- Food, Pharmaceutical and cosmetic products' formulation
- Improve formula and surfactants' screening.



HIGH PRESSURE FOAM ANALYZERS

*designed to characterize Foam properties
in demanding conditions*

FOAMSCAN™ HTMP



Generation by Gas Injection

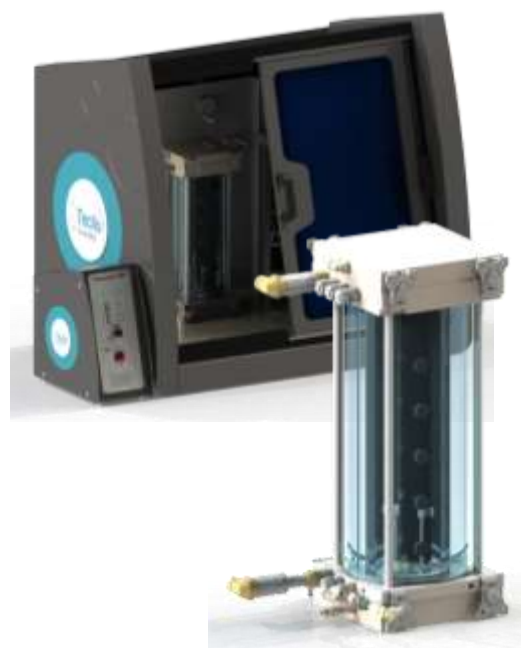
FOAMSCAN™ HTMP is designed to measure the ability of a liquid to generate foam by sparging a gas into the liquid through a Porous glass filter, at a temperature up to 120°C and a pressure up to 8 bar.

The software controls the injected gas flow rate and the foam volume is analyzed in real time by the images analysis software.

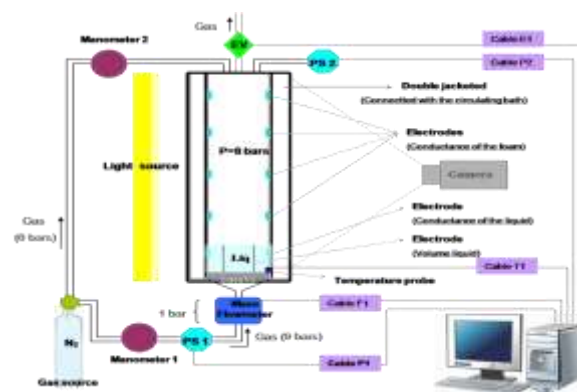
FOAMSCAN™ HTMP is equipped with a triple-jacket Glass tube to control both temperature (from an optional circulating bath) and pressure.

The cylindrical measuring tube can be equipped with electrodes to measure liquid fraction of aqueous foams, determined in real time by electrical conductivity.

FOAMSCAN™ HTMP is provided in a protective box that protects from light disturbance when operating experiments and protects the instrument from dust.



Measurements and Data	
<ul style="list-style-type: none"> Foam volume Liquid volume Liquid fraction Gas flow rate Temperature Pressure Foam conductance 	<ul style="list-style-type: none"> Volume of gas supplied Foaming capacity Foam stability Foam liquid stability Foam density



Applications

- Oil & Gas
- Effect of the foam under pressure and temperature
- Efficiency of the surfactant to create Foam in difficult conditions (EOR)

Technical specifications	
Flow rate	500 ml/min ; 1000 ml/min ; 5000 ml/min (real flow rate depends on the reference conditions of temperature and pressure)
Gas	Air, N ₂ , O ₂ , CO ₂ ...
Temperature	Up to 120°C
Pressure	Up to 8bar

FOAMSCAN™ DEPR

Generation by depressurization

FOAMSCAN™ DEPR is designed to measure the ability of a liquid to generate foam by depressurization or overpressure up to 8 bar and temperature up to 120°C.

FOAMSCAN™ DEPR is equipped with a double or triple-walled glass cylinder tube to control temperature (from an optional circulating bath) and pressure. The tube can also be equipped with electrodes to measure the liquid fraction of aqueous foams by conductivity and in real time.

A mass flow controller (flowmeter) operating at a flow range from to 500 mL/minute is connected to the tube. The gas flow range is adapted depending on the pressure inside the tube. An overpressure up to 8 bar can be applied in the tube and a pressure regulator allows to **control and maintain the pressure during the experiment**.

FOAMSCAN™ DEPR is provided in a protective box that protects from light disturbance when operating experiments and protects the instrument from dust.



Measurements and Data

- | | |
|---|--|
| <ul style="list-style-type: none"> • Foam volume • Liquid volume • Liquid fraction • Gas flow rate • Temperature • Pressure | <ul style="list-style-type: none"> • Volume of gas supplied • Foaming capacity • Foam stability • Foam stability • Foam density |
|---|--|

Applications

- Non aqueous Foam
- Effect on foam of dissolved gas in non aqueous or aqueous solution
- Foamability of solvent

Technical specifications

Flow rate	500 ml/min; 1000 ml/min ; 5000 ml/min (real flow rate depends on the reference conditions of temperature and pressure)
Gas	Air, N ₂ , O ₂ , CO ₂ ...
Temperature	Up to 120°C
Pressure	Up to 8bar
Option	CSA

FOAMSCAN™ HTHP



Generation by Gas Injection

The **FOAMSCAN™ HTHP** is designed to measure the ability of a liquid to generate foam by sparging a gas through a liquid **at high temperature up to 200°C and high pressure up to 100bar**.

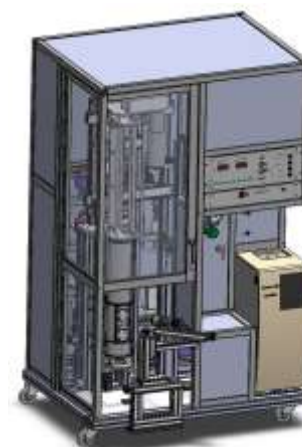
The foam is generated in Inconel cell. The gas is injected through the glass frit by a flowmeter. A thermocouple measures the temperature inside the cell.

The temperature control is achieved by oil circulation heater built into the environmental chamber walls. Foam volume is measured by foam probe.

Cell size analysis option is included to observe the bubble size distribution.

During the measurement, the pressure inside the cell is kept constant.

Automatic cleaning at the end of the measurement is done.



HTHP Standard



HTHP supercritical CO₂

Measurements and Data

- | | |
|---|---|
| <ul style="list-style-type: none"> • Foam volume • Liquid volume • Liquid fraction • Gas flow rate • Temperature • Pressure | <ul style="list-style-type: none"> • Volume of gas supplied • Foaming capacity • Foam stability • Foam liquid stability • Foam density |
|---|---|

Applications

- Oil & Gas
- Effect of the foaming under pressure and T°
- Efficiency of the surfactant to create Foam in difficult conditions (EOR)
- Supercritical CO₂
- Bubble size analysis at HTHP

Technical specifications

Flow rate	500 ml/min (real flow rate depends on the reference conditions of temperature and pressure)
Liquid Volume	150ml
Gas	Air, N ₂ , O ₂ , supercritical CO ₂
Temperature	Up to 200°C
Pressure	Up to 100bar



FOAM ANALYZERS

Consumables & Accessories


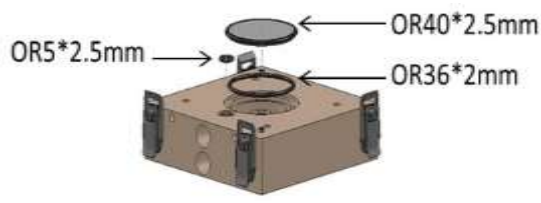
Porous Glass Filters

Porous glass filter fits into the base assembly, between an O-ring and the cell bottom. **They can be changed easily and are available in a range of different porosities.**

The standard porosity supplied corresponds to the reference **F028-3** and has a porosity of 16-40 µm. Porous glasses are sold per five

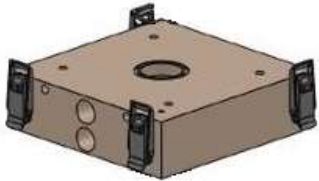
Reference	Porosity	Pore size	Diameter
F028-0	0	180-250 µm	40mm
F028-1	1	100-160 µm	40mm
F028-2	2	40-100 µm	40mm
F028-3	3	16-40 µm	40mm
F028-4	4	10-16 µm	40mm

O-rings

Ref.	NEW VERSION	Ref.	FORMER VERSION
C030-6 ORNN	A set of NBR O-rings is supplied which will fit the measuring tubes: 1 : 38*2 mm 1 : 22*1.5 mm 1 : 40*20*1 mm 1 : 40*2 mm 2 : 8*2 mm	C030-6 ORNO	A set of NBR O-rings is supplied which will fit the measuring tubes: 1 : 38*2 mm 1 : 40*2.5 mm 1 : 5 *2.5 mm 1 : 36*2 mm 2 : 8*2 mm
C030-6 ORVN	A set of FKM O-rings is supplied which will fit the measuring tubes: 1 : 38*2 mm 1 : 22*1.5 mm 1 : 40*20*1 mm 1 : 40*2 mm 2 : 8*2 mm	C030-6 ORVO	A set of FKM O-rings is supplied which will fit the measuring tubes 1 : 38*2 mm 1 : 40*2.5 mm 1 : 5 *2.5 mm 1 : 36*2 2 : 8*2 mm
NEW VERSION OF TUBE BASE		FORMER VERSION OF TUBE BASE	

Please send the identity number of tube, while ordering O-ring

Other Replacement Parts

Reference	Parts
VALVE	Luer valves (x5) & silicone pipe 30 cm
CCS	CSA calibration sphere (Optical calibration accessories for CSA option)
CLS	CSA light source for CSA option
PSC	Peristaltic pump
PSCH	Peristaltic pump head
NETT	Auto-cleaning cover
T-BC-90	Tubing for water bath (temperature up to 90° C) 4m
T-BC-140	Tubing for oil bath (temperature up to 140° C) 4m
E-FNM	<p>Foamscan Base Assembly. New Version</p> <p>That base assembly is able to screw on a mobile part which clamps the glass filter on the O-ring. The bubble size repartition is more uniform.</p> 

FOAM ANALYZERS

Technical Features

	FOAMSCAN™	FOAMSPIN™	MINIJET™	FOAMSCAN™ HTMP	FOAMSCAN™ DEPR	FOAMSCAN™ HTHP
Reference	FMS	FMSP	FMJT	FMS-HTMP	FMS-DEPR	FMS-HTHP
Foam generation	Gas injection / Stirring (option)	Stirring	Liquid injection	Gas injection	Gas depressurization	Gas injection
Tube included	No	No	Yes	Yes	Yes	Yes
Liquid volume	30-80ml	Direct 80-110ml Indirect 120- 180ml	100-200ml	30-80ml	30-80ml	150ml
Temperature	Up to 90°C	Up to 90°C	Up to 90°C	Up to 120 °C	Up to 120 °C	Up to 200 °C
Pressure	AP	AP	AP	8bar	8bar	100bar
Gas	Air, N ₂ , O ₂ , CO ₂	No	No	Air, N ₂ , O ₂ , CO ₂	Air, N ₂ , O ₂ , CO ₂	Air, N ₂ , O ₂ , CO ₂
Gas Flow / stirring rate	100- 5000ml/mn	500-6000RPM	100- 1000ml/mn	100- 5000ml/mn	100-5000ml/mn	100- 5000ml/mn
Defoamer-injection	Optional	Optional	Yes	No	No	No
Auto-cleaning	Optional	Optional	Yes	Yes	Yes	Yes
CSA	Optional	Optional	Optional	Optional	Optional	Yes
Camera Definition	CCD Camera 640x480	CCD Camera 640x480	CCD Camera 640x480	CCD Camera 640x480	CCD Camera 640x480	CCD Camera 640x480
IS Compatibility Computer not included	Windows XP, W7, W8, W10 32-64 bits	Windows XP, W7, W8, W10 32-64 bits	Windows XP, W7, W8, W10 32-64 bits	Windows XP, W7, W8, W10 32-64 bits	Windows XP, W7, W8, W10 32-64 bits	Windows XP, W7, W8, W10 32-64 bits
Instrument Size L / w / H (cm)	77*43*69	77*43*69	77*43*69	77*46*69	77*46*69	107*84*182
Weight (full instrument)	≈ 35kg	≈ 35kg	≈ 35kg	≈ 45kg	≈ 45kg	≈ 150kg

About US

TECLIS Scientific is a French company specializes in measuring instruments and services for Interface Science for more than 25 years.

TECLIS Scientific designs and markets analytical equipment and provides scientific expertise to characterize dispersed systems such as foams and emulsions and to characterize solids surface energy. .

An advanced technology software based on image analysis is applied in all instruments. A complete range of measuring instruments has been developed to study and understand interfaces properties of liquid/liquid, solid/liquid and gas/liquid interfaces.

TECLIS Scientific uses innovative engineering to create efficient instruments and software solutions which are easy to use for researchers.



Measuring Instruments for Interface Science

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