



**FOAM DETECTION
AND
CONTROL SYSTEMS**

LIQUID AND FOAM LEVEL MEASUREMENT

Hycontrol have the most extensive range of aqueous and non-aqueous foam detection systems in the world. These sensors and systems are purposely designed and manufactured to detect, analyse and process virtually any foam. They provide key benefits to industry including;- huge reductions in anti-foam products, increased batch sizes, reduced environmental pollution and significantly improved production efficiency.

The Hycontrol Charis range uses patented 'Intelligent Multi-Action' (IMA) sensor technology to detect the foam. This technology originated from Shell Oil's research and development team purely for the purpose of foam detection within their own business. This technology has now been integrated into Hycontrol to expand and develop further into a global, market leading foam detection range.

This range of products will detect a very light foam, even with heavy deposits coating the measuring probe. This unique ability differentiates the Hycontrol range from all other competitive foam detection systems.



FEATURES, ADVANTAGES AND BENEFITS

- **REDUCE ANTI-FOAM COSTS UP TO 40%**
- **REDUCE PROCESS DOWN TIME**
- **REDUCE WASTE AND PRODUCT LOSS**
- **INCREASE BATCH SIZE CAPACITY**
- **MEASURE FOAM + LIQUID SIMULTANEOUSLY**
- **IMPROVE PLANT EFFICIENCY**
- **AVOID ENVIRONMENTAL POLLUTION**
- **INCREASE PRODUCTION CAPACITY**
- **HYGIENIC FDA APPROVED**
- **IMMUNE TO PROBE FOULING**

FOAM PROBLEMS OCCUR IN MANY INDUSTRIES



FOOD



FUELS & OILS



PHARMACEUTICAL



CHEMICAL



WATER & WASTE

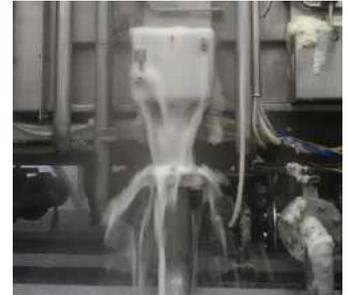
TYPICAL APPLICATIONS

- Food Processing
- Pharmaceutical
- Water and waste
- Chemicals
- Beverages
- Coolants
- Resin production
- Tanker washing plants
- Alcohol distilleries
- Pressure cookers
- Varnish production
- Antibiotic production
- Bio-fuels
- Bitumen production
- Animal feed
- Paper mills
- Sugar factories
- Brewing and yeast
- Oilseed processing
- Gas scrubbing
- Oil lubrication

SURESENSE - DETECTION, MEASUREMENT & CONTROL

The SureSense range allows for the accurate control of aqueous foam by sensing when the foam reaches the end of the probe. This range has excellent resistance to fouling and build up on the measuring probe and still continues to operate reliably with large deposits on the sensing element. The SureSense range can have single or dual set points, and is used extensively for reducing the amount of chemical anti-foam agents used. This range is designed to be used with a controller which can provide output signals to indicate foam density and foam level, utilising a 4-20mA output. This range can be mounted horizontally or vertically in the tank.

- 316 stainless steel body
- FDA approved materials
- SGS system certificate
- PEEK (chemical resistant)
- Unique IMA® sensing technology
- Probe length up to 6m
- Steam sterilizable
- Pressure up to 10 bar
- ATEX system certificate
- Accuracy +/- 1mm



MULTISENSE - DETECTION OF FOAM AND LIQUID

The MultiSense can measure aqueous foam and liquid levels at the same time, and can provide an output of both levels simultaneously if required. This range is available in three versions, one for foam, one for liquid level only and one for both foam and liquid. The device uses an array of small sensors built into one probe body and is mounted vertically into the tank. Each sensor acts as a separate micro-sensor, which is used to measure the material adjacent to it. This enables precise level control of both foam and liquid levels simultaneously. The MultiSense uses patented IMA sensing technology which provides reliable continuous level measurement but with the ability to ignore any product fouling on the sensor probe.

- Unique IMA® sensing technology
- Pressure up to 40 bar - (options)
- Foam and Liquid measurement
- Temperature up to 180°C
- Wide range of process connections
- Hygienic construction
- 316 stainless steel probe
- 4-20mA Output
- Accuracy +/- 1mm
- Steam sterilizable



DIFOAM - NON-WATER BASED FOAM

The DiFoam range of sensors and controllers are designed for the measurement and control of non-water based foams, these are very similar to the SureSense and MultiSense but have very different electronic detection circuits, due to the large difference in dielectric of the materials measured. They provide an efficient, reliable and cost effective solution to foam control in a diverse range of industries, where the production and control of foam causes a problem. Typical applications include oilseed processing, oil and gas separation, resin production, solvents and gas scrubbers.

- 316 stainless steel sensor
- Detects non-water based foam
- Wide range of process connections
- Unique IMA® sensing technology
- Accuracy +/- 1mm
- Temperature up to 200°C
- Pressure up to 40 bar
- PEEK (chemical resistant)



FOAM TENDENCY ANALYSER - FOR FOAM PREDICTION



Foam can occur in many processes in different applications but can also manifest itself to show later downstream of the process. For example, vehicle washing stations or outlets, treatment works into river courses or coastlines. Here the foam may not develop until it is agitated by the flow downstream or by the constant churning of the surf. This means it may look ok before it leaves a works, but when into the environment it can produce an unsightly pollution incident.

The FTA100 is a unique foam control system that provides a pre-emptive (rather than reactive) approach to foam control. Operating fully automatically, it measures the tendency of a liquid to create foam and can take action before foaming occurs. This is achieved by taking a sample from the process and analysing the foam tendency in a small test cell.

The FTA includes a series of pumps for sample handling. A fill pump (A) is used to draw a sample from a process into the test cell (B). The sample in the test cell is analysed by sparging air through it to create foam. The foam is then measured using a foam sensor. Once the measurement is complete the sample is removed by means of the drain pump (C), and returned to the process or discarded.

EARLY WARNING

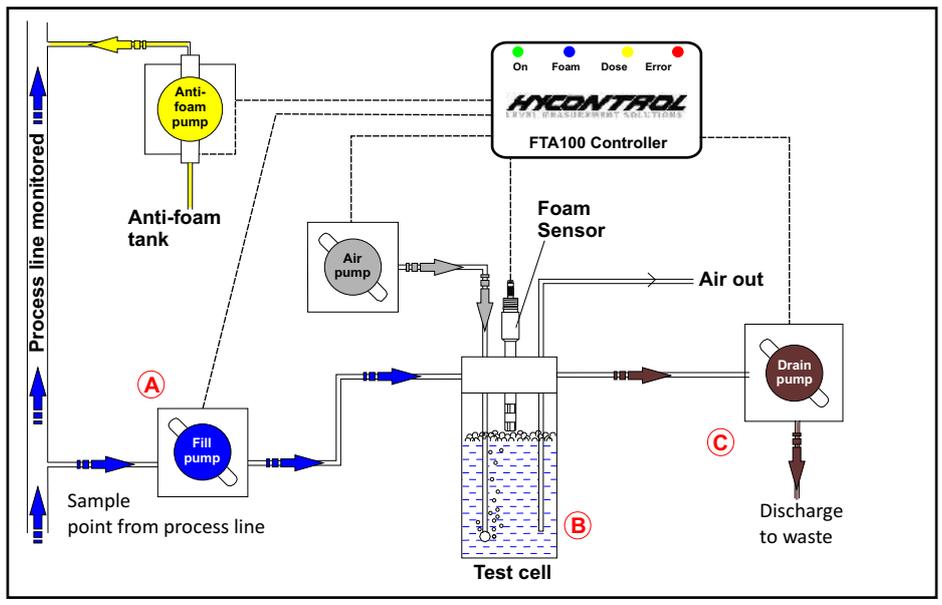
The system can be set to act as an early warning to detect foam before it occurs elsewhere downstream of the process. Alternatively, it can be used to simulate a process to indicate that foam is being generated.

ERROR DETECTION

A built in error detection system prevents the pumps running if the sample is not flowing correctly. For example; if the test cell does not fill then the system will generate an error alarm.

MINIMAL MAINTENANCE

The FTA100 has been designed for minimal maintenance intervention and will operate for long periods without any attention. The test cell can be easily removed to rinse out any debris that builds up, when necessary. The FTA includes an anti-foam pump system to control the foam and can generate a signal to a process controller or an alarm.



TYPICAL APPLICATIONS



Outflows from effluent plants, industrial car wash systems



Public fountains and water feature pollution



Outflows from effluent plants into rivers, streams and coastlines

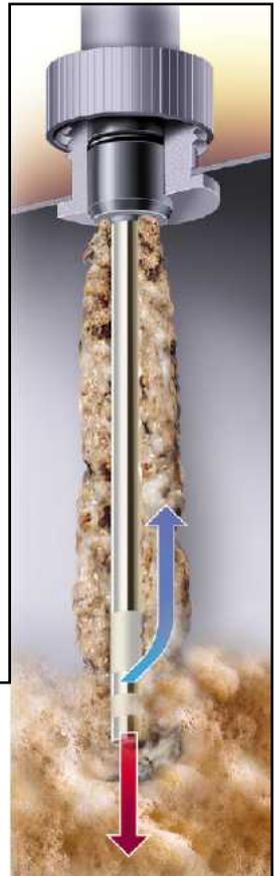


Sewers and drains which are inaccessible for foam detection

UNIQUE FOULING IMMUNITY WITH IMA SENSING

Product fouling and deposits on a measuring probe are often associated with many foaming applications. The high sensitivity required to detect light foam products is essential but equally important is the ability to differentiate between product coating and product rising in a tank. This is where Hycontrol IMA (Intelligent Multi Action) sensing leaps ahead of all other 'foam' detecting technologies, as it will operate efficiently and repeatably even when the probe becomes fouled with residual product.

Hycontrol foam control systems utilise IMA sensing technology incorporating a special guard electrode shown on the diagram opposite (in blue). This guard electrode disrupts the signal produced from the accumulated fouling on the probe which has a desensitising effect on the switch. This then enables the main foam sensor (in red) to ignore this product build up no matter how thick it is and to only monitor the foam within the process. Therefore even with dense or sticky fouling on the sensor may become, the Hycontrol foam probe continues to function giving accurate and reliable foam control.



A small batch reactor still operating efficiently with the probe covered and totally hidden!

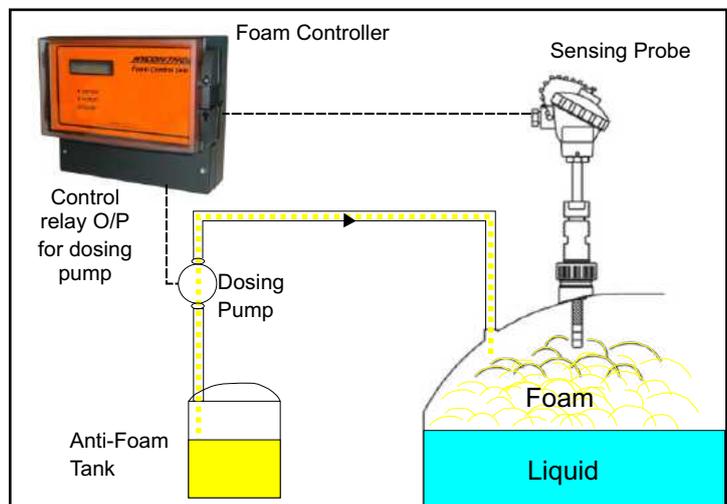
IMA principal displaying the guard probe and the measuring probe

TYPICAL FOAM PROCESS CONTROL SYSTEM

Many foam applications require not only a switch or level measurement device to detect the foam, but also a system to control the process. A typical example of automatic foam control would be in a fermentor in a pharmaceutical process, whereby it is known that during the process foam will occur. It may be that the process requires a minimum amount of foam to chemically react or no foam at all but this will vary from application to application. Historical control has been automated to dose at a nominal amount on a timed basis, whether there is foam or not.

However, what typically will happen is that overdosing occurs which can have several detrimental side effects. This includes a vast overdose effect using far more anti-foam chemical agent than is actually required or more importantly it may have an effect on the biological process such as reducing the efficiency of the process and thus reducing yield from the batch. Both scenarios are undesirable and both can be rectified easily.

Hycontrol provide a complete automatic dosing control system similar to the one shown in the schematic adjacent. This system operates by taking a measurement, looking for foam, then if foam is detected releasing a small amount of anti-foam agent which is controlled by the Hycontrol controller. If the foam disappears then it will stop dosing. However, if the foam persists it will automatically continue the dosing rate and dose again until the foam has reduced to an acceptable level. This system provides a closed loop control to control foam and reduce anti-foam agent, at a minimal cost but with maximum efficiency.



FOAM DETECTION SPECIFICATIONS

SPECIFICATION	SURESENSE	MULTISENSE	DIAFOAM	FOAM TENDENCY ANALYSER
AQUEUOUS	Yes	Yes	No	Yes
NON-AQUEOUS	No	No	Yes	No
LEVEL SWITCH	Yes	Yes	Yes	Yes
CONTINUOUS LEVEL	Yes	Yes	Yes	No
MAX. PROBE LENGTH	4m Max. *	4m Max *	1m	n/a
VERTICAL MOUNTING	Yes	Yes	Yes	n/a
HORIZONTAL MOUNTING	Yes	No	Yes	n/a
RELAY OUTPUT	1 or 2 SPDT 3A/230V	3x SPDT 3A/230V	2x SPDT 3A/230V	1x SPDT 3A/230V
VOLTAGE	110/230V AC or 24V DC	90/300V AC or 24V DC	110/230V AC or 24V DC	110/230V AC
4-20mA OUTPUT	Yes	x2	Yes	No
FOAM DENSITY OUTPUT	Yes	n/a	Yes	No
FDA APPROVED	Yes	Yes	Yes	n/a
HYGEINIC OPTION	Yes	Yes	Yes	n/a
ATEX	Yes	No	No	n/a
DUAL SENSING	Yes	n/a	No	No
IMA SENSING	Yes	Yes	No	Yes
FOAM PREDICTION	No	No	No	Yes

* Probes can be manufactured longer if required but will be priced on an individual basis. Contact Hycontrol for more information.

When considering a foam application it is important to identify all the key parameters required to make the correct selection. Please consult Hycontrol for a pre-application questionnaire providing a check list to ensure the correct probe is chosen and to enable Hycontrol to issue a performance warranty.



HONDA
The Power of Dreams

Honda
Automotive
Paint production

Client
Industry
Application

A paint production process included a vacuum stage during which solvent was extracted. However, foam was generated when the vacuum was created, causing considerable disruption to the process. A Charis Foam Control System was installed to close the vacuum valve and inject controlled amounts of nitrogen into the process, restoring reliable control throughout the whole process.



Lilly
Veterinary products
Research vessels

Client
Industry
Application

Having installed a new suite of research vessels, Lilly (manufacturer of animal drugs), discovered that one process was rendered inoperable by foaming. The whole suite of vessels was effectively out of action. Once Charis Foam Sensors and controls were installed the problem was completely solved. They regained effective and reliable control at every stage of the process.

TYPICAL APPLICATIONS & USERS

SASOL
reaching new frontiers



Sasol
Oil & Gas
Gas scrubbing

Client

Industry

Application

Sasol used a gas scrubbing process as part of its production. Foam occurred in the column which reduced the available flow rates. The company evaluated many systems before commissioning Charis to develop a special multi-functional sensor which could be used to analyse the foaming conditions in the column.

genzyme
A SANOFI COMPANY

Genzyme
Pharmaceutical
Fermentation

Client

Industry

Application

A well known U.S. Diagnostic pharmaceutical manufacturer installed a new Charis Foam System on a production fermenter. The next week the anti-foam use fell by 40% and the product yeild rose by 15%. The company investigated and found that the old system had been adding too much antifoam, and unknown to them this had significantly reduced the efficiency of the process. The payback period of the new system was immediate.



GlaxoSmithKline
Antibiotic production
Fermentation

Client

Industry

Application

GSK, A well-known British pharmaceutical company installed Charis Foam Controls in its antibiotic production fermenters. The improved foam controls gave a reduction in the headspace volume and a resulting increase in production volume. The payback time for this application was a matter of days.



Giusti Briggs
Food
Vacuum cooling

Client

Industry

Application

Within the food industry a vacuum cooling process is often employed which results in rapid foaming. Briggs Giusti is a major cooking vessel manufacturer whom have incorporated the Charis Foam System as a standard part of their equipment to prevent product loss and damage to vacuum pumps.



Scott Bader
Resin manufacture
Gas stripping

Client

Industry

Application

The production of resin generated foam as part of the gas stripping process. The foam was particularly difficult to measure and a new high-sensitivity sensor was developed for this application.



ICI
Chemical
Effluent treatment

Client

Industry

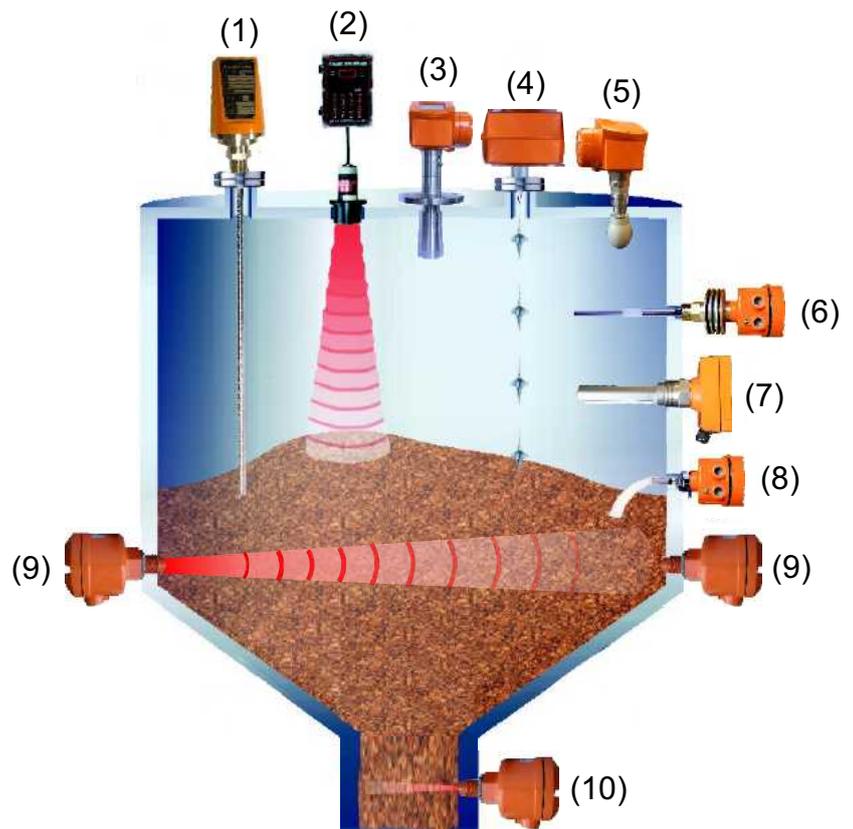
Application

Was having problems with detergent leaking into the effluent stream that found its way into the nearby river. This resulted in large amounts of foam at the outflow. Charis designed a system which gave an early warning before any foam appeared in the river, followed by intervention, thus eliminating pollution into the environment.

HYCONTROL LEVEL TECHNOLOGIES

Product Range For Solids :-

- (1) TDR Radar For Solids
- (2) Ultrasonic, 'Through Air'
- (2) 2 Wire Ultrasonic Transmitter
- (3) FMCW 2 Wire Radar
- (4) Continuous 'Servo' Level Indicator
- (5) FMCW 2 Wire Radar
- (6) Capacitance Level Switch
- (7) Vibrating Probe Level Switch
- (8) Rotating Paddle Level switch
- (9) Microwave Level Switch
- (10) Doppler Flow Switch



Product Range For Liquids :-

- (1) By-Pass Level Indicator With Radar
- (2) TDR Radar For Liquids
- (3) 2 Wire Ultrasonic Transmitter
- (4) FMCW 'Horn' Radar 2 Wire
- (5) Magnetic Float Switches
- (6) FMCW 2 Wire Radar
- (7) Capacitance Level Switch
- (8) RF Admittance Level Switch
- (9) Side Mounting 316 SS Float Switch
- (10) Tuning Fork Level Switch
- (11) Tuning Fork Level Switch
- (12) Ultrasonics 'Through Wall'
- (13) Mini Magnetic Float Level Switch
- (14) Foam Switch

