www.southforkinstruments.com

FOAM DETECTION AND CONTROL SYSTEM OVERVIEW

LIQUID AND FOAM LEVEL MEASUREMENT

Hycontrol have the most extensive range of foam detection systems in the world. These sensors and systems are purposely designed and manufactured to detect, analyze 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.

Hycontrol's foam detection 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 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 THE PRESENCE OF FOAM + LIQUID**
- **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

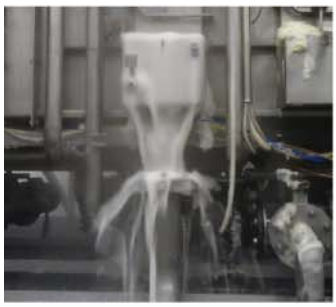
TYPICAL APPLICATIONS

- **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+ allows for the accurate control of aqueous foam by sensing when foam is present at of the probe. With Hycontrol's unique IMA sensing technology, this Suresense+ has excellent resistance to any fouling or build up on the measuring probe and will continue to operate reliably with even the largest of deposits on the probe sensing elements.

A SureSense+ probe can have one, two or three individual sensing points and the control unit can work with up to three sensing points in total, either on the same probe on from probes in up to three separate vessels. Suresense+ probes can be mounted both horizontally or vertically in a tank.



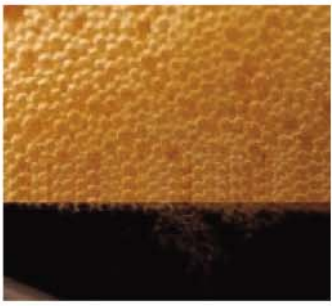
Suresense+ units consist of an electronic unit connected to up to three sensing probes. Each unit has five relay outputs configurable for foam detection, dosing control, high level indication and liquid level detection. A 4-20mA output is included to indicate foam quantity. With a variety of control methods built into the advanced foam control electronics, the Suresense+ is used extensively in plant protection applications and for reducing the amount of chemical antifoam agents consumed.

- **Probes available in a variety of materials**
- **Unique IMA® sensing technology – immune to fouling**
- **Std. probe lengths up to 3m**
- **Connect up to 3 separate probes**
- **Multiple control outputs**
- **Liquid detection capability**
- **PEEK (chemical resistant)**
- **Temperature up to 150°C**
- **Pressure up to 10 bar**
- **ATEX system certificate**
- **Resolution +/-1mm**

SMARTFOAM – SINGLE POINT FOAM DETECTION

The SmartFoam probe is used for single point foam detection in a wide variety of applications. It's simple design consists of a robust, sensing probe with built in electronic unit in it's head. The unit is dc powered and provides a single relay to put to indicate when foam is detected. The output can be used to trigger antifoam agent doing or as a alarm signal.

SmartFoam is an exceptionally economical way to reliably detect the presence of foam and can provide significant payback in terms of reduced antifoam chemical consumption or clean up costs



A SmartFoam probe is installed into closed tanks and vessels through a ¾" BSP or NPT threaded port. For open vessels and channels, SmartFoam can be positioned in it's desired position with a simple bracket.

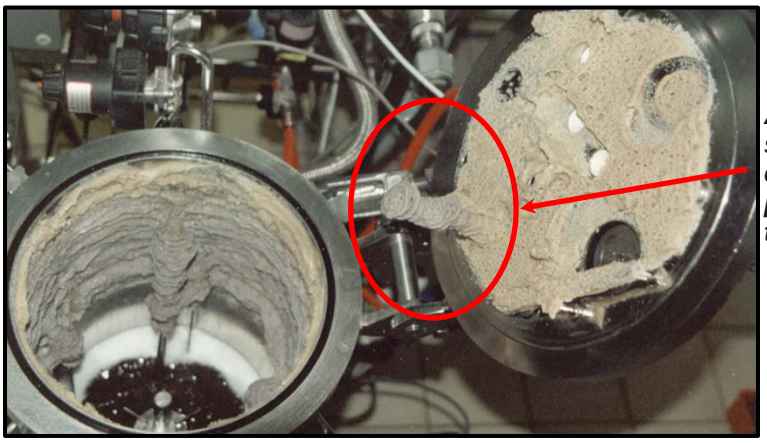
SmartFoam probes are constructed from 316 stainless steel and PVDF for compatibility with many processes. Probes are easily cleaned and are IP66/67 rated for wet installation locations.

- **Robust construction**
- **Unique IMA® sensing technology – immune to fouling**
- **Probes available in a variety of lengths**
- **316 Stainless Steel wetted parts**
- **Low installation cost**
- **Simple to set up**
- **24 VDC power supply**
- **Built in time delay**

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 utilize 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 desensitizing 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

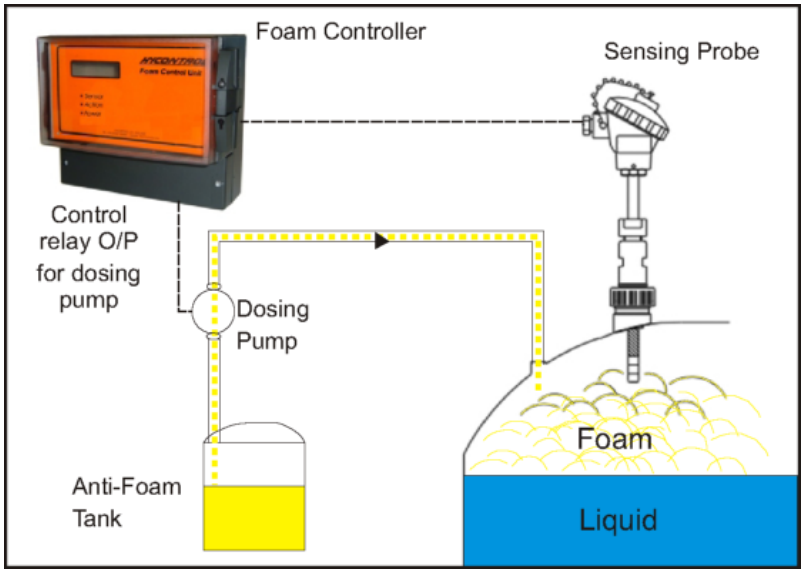
TYPICAL FOAM PROCESS CONTROL SYSTEM

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 fermenter 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.



TYPICAL APPLICATIONS & USERS

Sasol	Client
Oil & Gas	Industry
Gas scrubbing	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 multifunctional sensor which could be used to analyze the foaming conditions in the column.

Genzyme	Client
Pharmaceutical	Industry
Fermentation	Application

This well known US 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 yield 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	Client
Antibiotic production	Industry
Fermentation	Application

GSK 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 was days.

Giusti Briggs	Client
Food	Industry
Vacuum cooling	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	Client
Resin manufacture	Industry
Gas stripping	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	Client
Chemical	Industry
Effluent treatment	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.

Honda	Client
Automotive	Industry
Paint production	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 to the vacuum valve and inject controlled amounts of nitrogen into the process, restoring reliable control throughout the whole process.

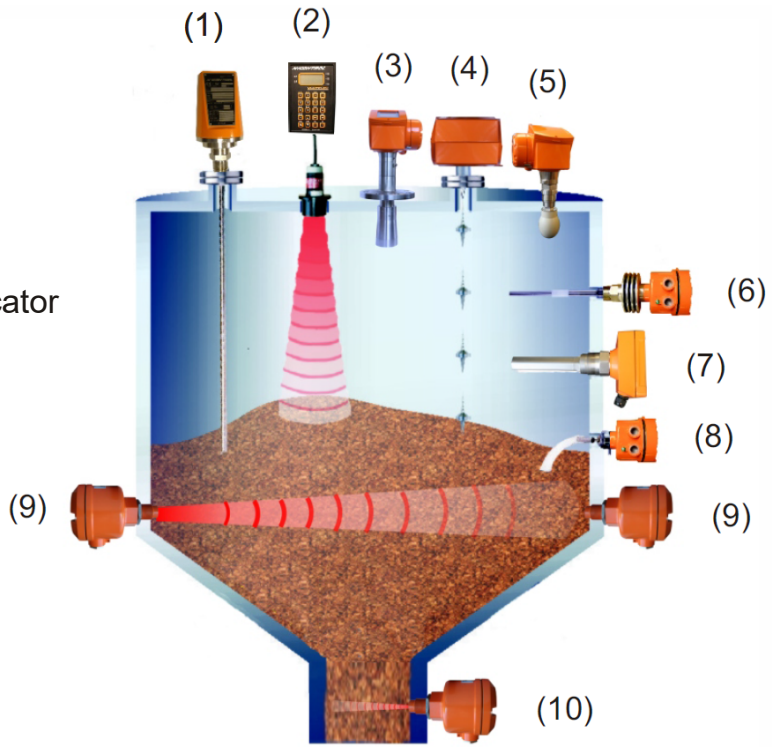
Lilly	Client
Veterinary products	Industry
Research vessels	Application

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.

HYCONTROL LEVEL TECHNOLOGIES

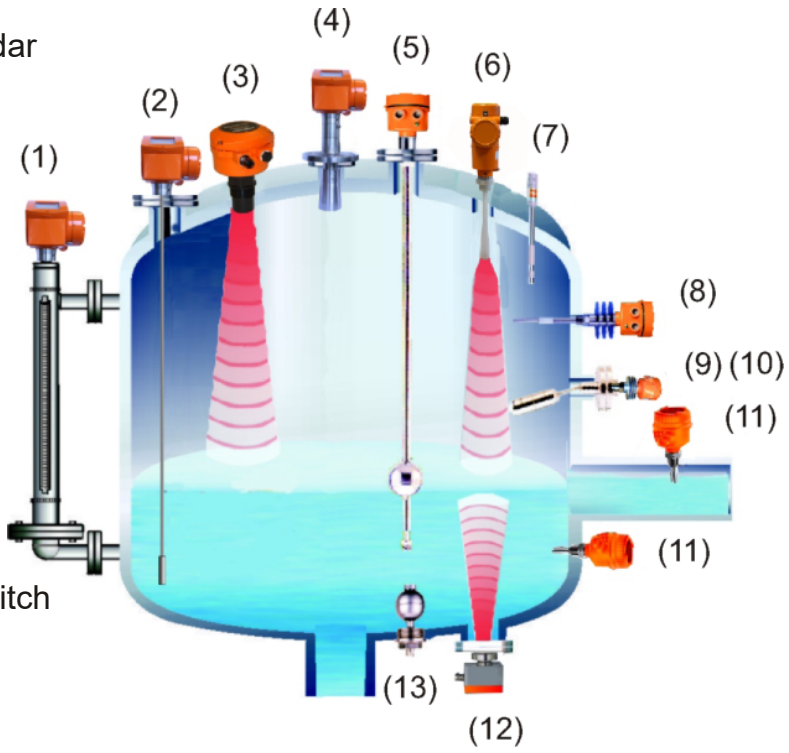
Product Range For Solids

(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) Foam Level Switch
(8) Capacitance Level Switch
(9) RF Admittance Level Switch
(10) Side Mounting 316 SS Float Switch
(11) Tuning Fork Level Switch
(11) Tuning Fork Level Switch
(12) Ultrasonics Through Wall'
(13) Mini Magnetic Float Level Switch



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