

# FRUIT PROCESSING *digital*

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## Sustainable beverage production – ultrasonic waves prevent biofilms



# No chance for biofilms and deposits

| Biocorrosion | Biofilms | Deposits | Intelligent Deposit Protection® Technology | Sounders | Ultrasound |

*The genesis of biofilms and the resulting deposits can have drastic effects in the specific processes of the beverage industry. The thin, watery layer of slime consisting of microorganisms, bacteria and fungi can be found in almost all industrial production facilities across a wide variety of industries. A preventive solution is the use of ultrasonic waves, which prevent adhesion from occurring in the first place.*

Mostly in the dark, there is an arbitrary settlement of microorganisms on liquid-carrying surfaces. As a result, these multiply and form a kind of protective film, which ensures even better adhesion and at the same time increases the resistance to external influences. Further germs establish themselves and promote the growth of the film, which now also begins to spread over an area. Repeated detachments can get into the actual medium. Since biofilms offer an excellent basis for bacteria and

germs such as Legionella and at the same time have a high resistance to various disinfectants, they are a serious risk to product safety. The new and adapted Intelligent Deposit Protection® technology tackles the problem even before any microorganisms have colonized it for the first time. For this purpose, sounders are glued to the equipment to be protected from the outside. So that these do not come off, specially selected 2-component adhesives are used. This has the advantage that no mechanical changes/adjustments have to be made to the machines themselves and installation can thus be kept as low as possible. In applications in which the sounders are exposed to high temperatures, high-temperature sounders and high-temperature adhesives are used analogously. The sounders now send out ultrasonic waves with a non-cavitative effect, which penetrate the surface and diffuse into the medium (water, liquids, products). The ultrasound destroys the cell membrane of unicellular organisms and thus prevents their settlement.



*If you look at the process chain in the production of apple juice as an example, you will find some process-related applications for ultrasonic technology. In addition to thick juice coolers, raw juice warmers, juice cleaners and pasteurizers, use in bottle washing machines and cooling media.*

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*Installation of ultrasonic technology on a pasteurizer.*

### Optimized for flexible customization options

The propagation of the sound waves is influenced by various factors. Solids content and density of the conveyed medium, layer thickness of the transferred material, ambient temperatures, etc., all of these aspects ultimately influence the overall result. The performance requirements for products, emulsions and liquids are therefore very nuanced. In order to adequately meet the requirements, the further developed IDP® technology measures the named variables and derives the necessary services and frequencies. In addition, deviations in the measured values determined are registered and, if necessary, adjusted; this happens autonomously and continuously. This ensures that the best possible combination of power and frequency is always available. In addition, the performance has been increased by 3.5 times (compared to the previous model) and performance duration variables have been integrated in order to enable an even broader performance spectrum. Another innovation is the technical integration of a USB port. In this way, planned system and software updates can be installed conveniently via plug & play. So that the user can always rely on the system, it has extensive options for evaluating results and analyzing errors. The new interface allows external devices to be connected, thus creating the basic requirements for Industry 4.0.

### Increasing diversity raises the requirements

The beverage industry is also facing new challenges in the areas of fruit juice production. The desire of consumers for a large selection of the most varied of products with simultaneously increasing quality requirements play an essential role in production. Process chains must be adaptable quickly and flexibly; this must not have a negative impact on quality. Too quickly, there can be a massive loss of image among consumers, caused by beverages contaminated with germs. However, if the consumer notices deviations in taste, smell or appearance while consuming it, it

is already too late. That is why ensuring and maintaining process reliability is one of the essential pillars of error-free and economical production and a guarantee for a high-quality end product.

### Application options are numerous

In order to ensure a successful application, the system requires a metallic liquid-carrying surface and a permanent supply of electricity. The sound reinforcement of plastic pipes is made possible by an alternative installation. For the best possible result, the application should be cleaned before installation. If you look at the process chain in the production of apple juice as an example, you will find some process-related applications for ultrasonic technology. In addition to thick juice coolers, raw juice warmers, juice cleaners and pasteurizers, use in bottle washing machines and cooling media (cooling towers, wet separators, evaporative cooling systems, plate heat exchangers and tube bundle coolers) are now standard applications. By using IDP®, a cooling tower can be operated safely within the limit values in accordance with the German 42nd BImSchV (Federal Immission Control Ordinance), while at the same time minimizing the addition of biocides. A minimal addition is usually still required if there is a strong infiltration of foreign germs, for example to compensate for evaporation. The minimized additions usually amount to 3-10 % of the previous addition. “We are always in direct contact with our customers,” notes Jan Kelling co-founder of HASYTEC. “A big advantage for us because we can develop many customer inquiries / concerns into new standard applications. This has immense potential, many concerns can be transferred across a wide variety of industries and not only individual users are looking for possible solutions. “

### Prominent example of Bionade

Bionade GmbH has always placed a strong focus on sustainable and environmentally friendly production of its

## ULTRASOUND TECHNOLOGY



O. Klein (Filling Manager) & F. Reinbender (Sales Manager) of Bionade GmbH

beverages. The aim is to reduce the ecological footprint in all areas of the company. At the beginning of the collaboration there were intensive consultations and planning phases," recalls Jan Kelling. "It is all the more gratifying when the system is installed, works perfectly and the customer is satisfied." At Bionade, the system is already

installed on the bottle washing machine and in the beverage bottling facility (pasteurizer). Significant savings in the addition of chemicals were achieved in the bottle washing machine. The pasteurizer benefits from an extended service life of up to 8 weeks. In addition, the intervals between maintenance and cleaning work are extended.

### Further advantages of avoiding deposits

Caused by biofilms and deposits, production systems, lines carrying liquids, tanks and cooling circuits are subject to biocorrosion. In the long term, the raw materials are attacked, which makes them porous and brittle. This can lead to defective lines or even breaks, which can lead to restrictions in production or even to its standstill. The result is rising costs for maintenance and new investments. A factor that is difficult to measure is the higher energy consumption of various applications when added components lead to a decrease in efficiency (heat transfer). At the same time, the growth can reduce the flow rate of the medium, which leads to problems when filling or maintaining the pressure of lines. IDP® increases the production and operational reliability of the systems as well as their expected service life. At the same time, the technology is environmentally friendly and conserves resources. Ultrasound is a very good example that sustainability and profitability do not have to contradict each other.

### HASYTEC Electronics GmbH

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