

SEEPEx.

An Ingersoll Rand Business

**ENERGY EFFICIENT
CONVEYING
SAI FOR BREWING
AND DISTILLING**



AN INTELLIGENT CONVEYING CONCEPT.

The requirements in the brewing and distilling industries are constantly increasing as the market becomes more competitive and diverse.

- Save on operational costs and increase energy efficiency
- Cope with longer transport distances
- Ensure maximum process reliability
- Increase productivity

All over the world, beverages are produced, packed and delivered to millions of consumers who rely on the quality of these products. No matter the beverage – beer, malt drinks, non-alcoholic beer or spirits – economical production is always the main challenge.

Technologies that are geared towards efficiency and quality are key. Since 1972, SEEPEX – a leading worldwide specialist in pumping technology with progressive cavity pumps, digital solutions, macerators and control systems – has been rising to each challenge.

SEEPEX created Smart Air Injection (SAI), an intelligent package unit that is technically and economically optimized to handle spent grain and draff in breweries and distilleries. We also offer a wide range of first-class services for all stages of your pump's life cycle. Our competent service guarantees the optimal operation of SEEPEX pumps for many years, saving both operating and maintenance costs.

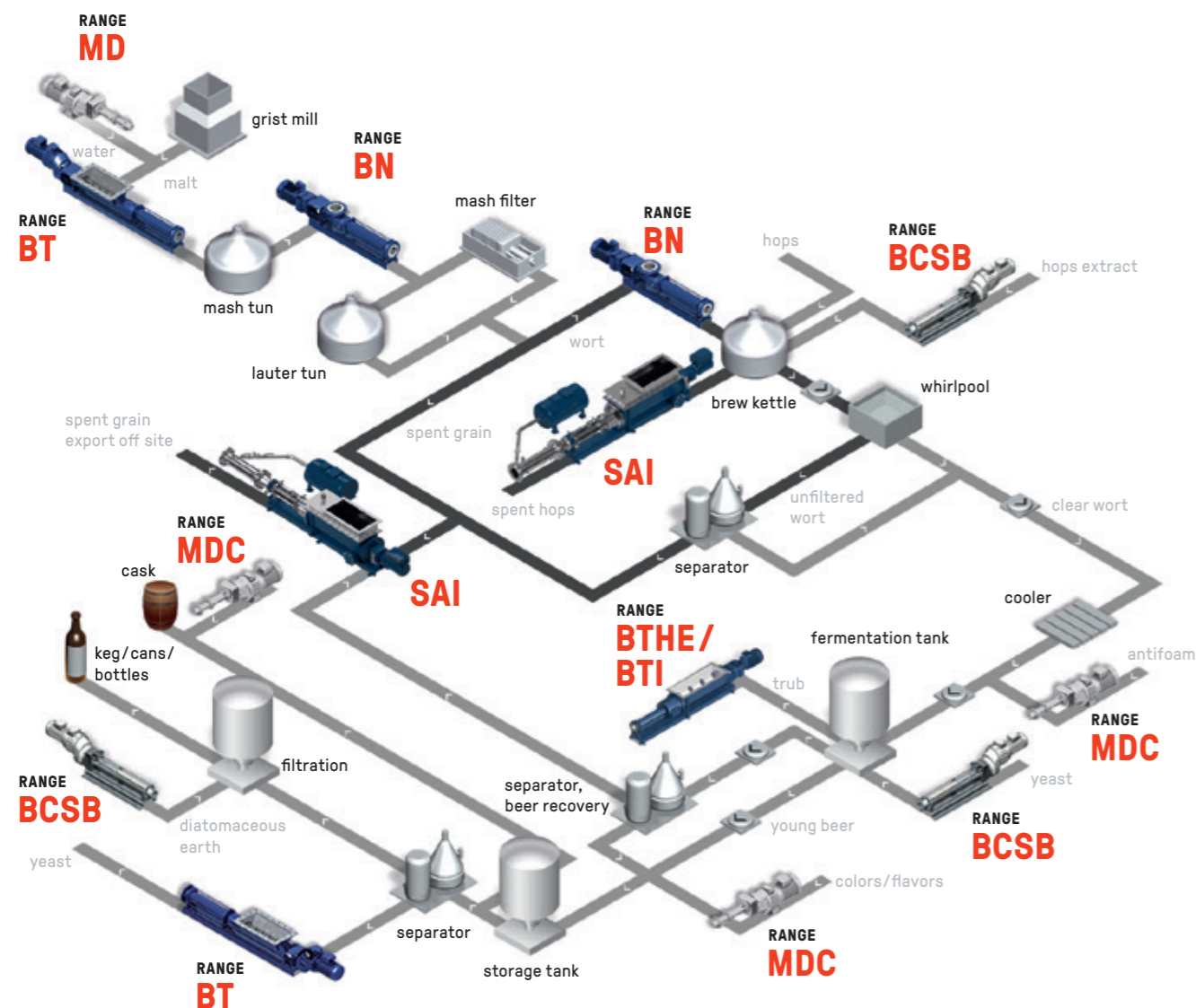
The highest quality and hygienic standards, customized conveying systems and economically optimized solutions: SEEPEX offers all this to the brewing and distilling industries.



THE PRODUCTION PROCESS.

Smart Air Injection (SAI) is a customized solution used to efficiently convey spent grains with controlled air pulses.

BREWERY FLOW CHART



BACKGROUND

One of the by-products from beer and whiskey production is spent grains. These grains are rich in ingredients: protein, malt sugar, trace elements, enzymes, vitamins and fiber. At the end of the mashing process, pneumatic conveying systems transport the spent grain from the brewery to silos, often hundreds of meters away. It is then transported further for use as animal feed. Recently, spent grains have also been used to generate energy in biogas plants or to produce biofuel.

Up until now, the grains were conveyed with conventional pneumatic expeller units using uncontrolled volumes of compressed air. In large companies, hundreds of tons of spent grain are produced using thousands of kilowatt hours of compressed air daily.

TASK

The requirement to reduce operating costs and increase energy efficiency, to manage longer transport distances and to maximize process reliability and increase productivity can only be met with advanced technology. The abrasive spent grain has to be effectively transported and the high volume use of compressed air effectively managed to optimize operational and utility costs.

SOLUTION

Smart Air Injection is a customized package unit used to convey spent grain with controlled air pulses. The spent grain is moved in plugs of several meter length (dense phase conveying), resulting in minimal air consumption and excellent energy efficiency. These results cannot be achieved with the conventional pneumatic expeller units. SAI's benefits arise from the purposeful combination of two technologies: progressive cavity pumps and pneumatic dense phase conveying.

BENEFITS

- Dense phase conveying offers reduced air consumption (up to 80%) and increases the service life of the conveying pipeline
- Controlled air injections lead to lower operating costs
- Long distance transport up to several hundred meters
- Increased process efficiency due to reduced mash-out times (up to 60%)
- Flexible operating point means easily conveying spent grains at varying wetness-content as well as high process safety

MULTITALENTED.

Smart Air Injection is a multi-talented solution that is used successfully in various industry sectors. The system is a combination of a progressive cavity pump and pneumatic dense phase conveying.

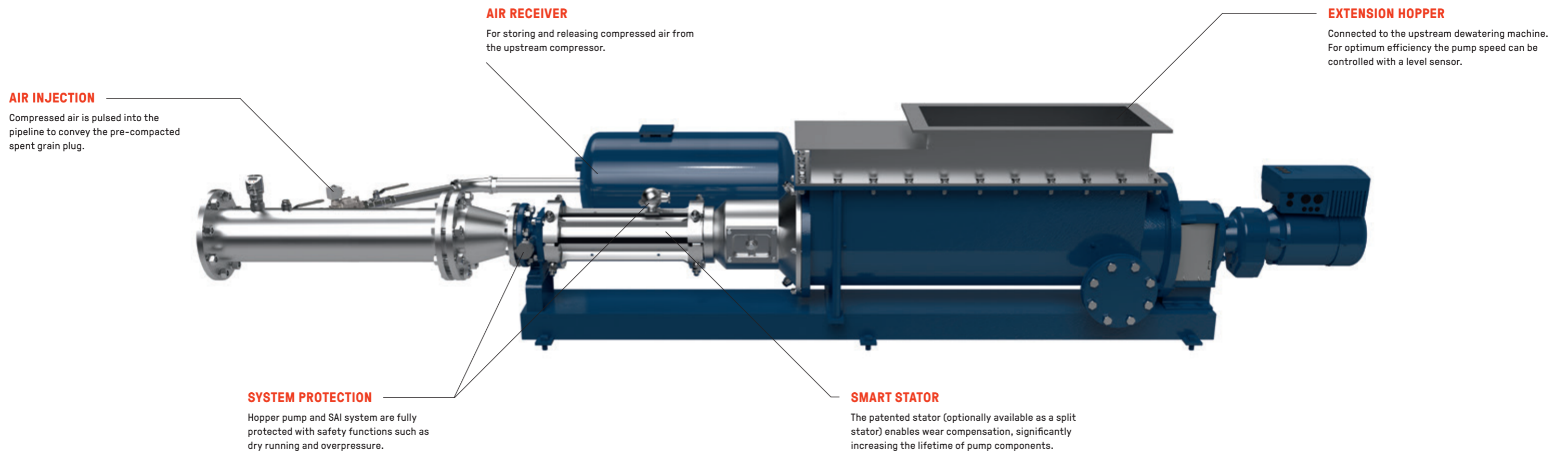
INNER MECHANICS

- Mash-out times are reduced by up to 60%, which increases process efficiency.
- Intervals between air injections of up to 5 minutes, during which only the pump delivers, and the following short-term air pulses, significantly reduce the total air and energy consumption by up to 90%.

SAI offers a high degree of process flexibility and reliability. The unit conveys media with variable moisture content of 60-85% problem-free while also maintaining the same efficiency and process stability.

The process efficiency increases due to the reduced mash-out times, offering better productivity by enabling a greater number of brews per day. Furthermore, the system can be easily integrated into existing automation and control systems. SAI is a clean solution for breweries, as the removal of the spent grain is an essential and complex part of the brewing process.

SAI uses significantly less compressed air compared to conventional processes. The SEEPEX system compacts the spent grain into large plugs and uses compressed air to transport the plugs to silos or storage tanks. Compared to the compressed air systems commonly used in the industry today, which operate with a continuous air supply, Smart Air Injection consumes up to 90% less energy.



SAI offers a range of benefits for problem-free conveying of spent grains.

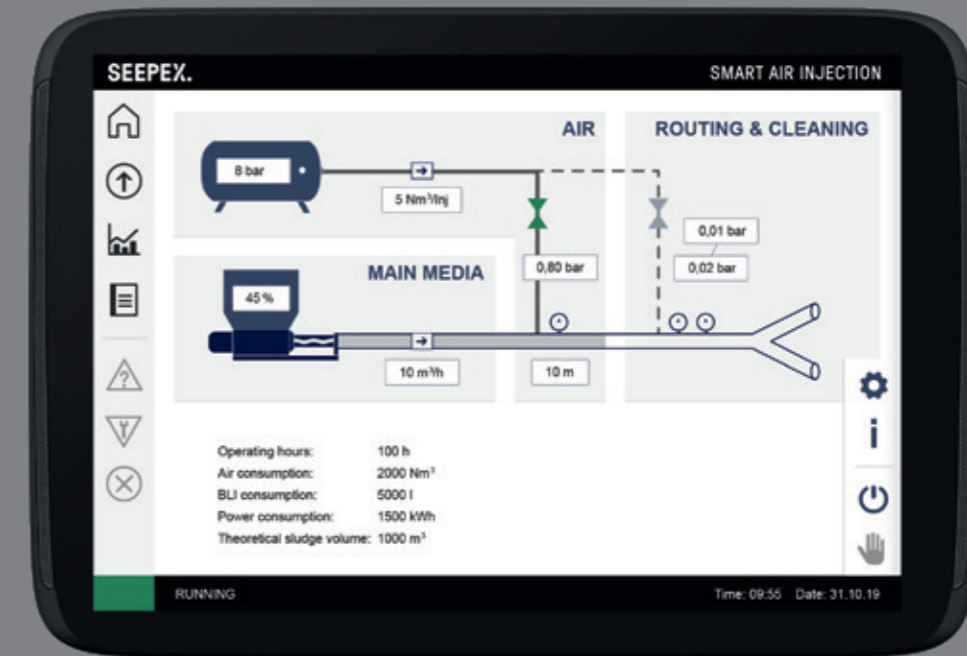
WHAT COUNTS

FEATURES

- Long transport distances up to 1 km possible
- Flexible piping with integrated cleaning and efficient vertical transport
- Small compressors due to low air consumption
- Full package unit: pump, air components, sensors and actuators with application-specific control logic integrated into your control system
- All functional components are designed, selected and integrated into the SAI software
- Extensive SEEPEX services: application clarification, project coordination, system design, engineering and commissioning
- Retrofit into existing spent grain buffer tanks (expeller units)
- Process monitoring and optimization with SEEPEX Connected Services

BENEFITS

- Minimal operating expenses: significantly reduced air use (up to 90%) results in fewer energy costs
- Increased process efficiency and productivity with lower mash-out times (up to 60%)
- High flexibility and reliability for varying wetness-content of spent grain
- Increased service life of the conveying pipeline due to pneumatic transport at moderate speed



AT A GLANCE

SAI CONTROLLER

The SAI controller enables the visualization and control of the entire SAI process including fault diagnostics. Compressed air usage is controlled and all important process values and consumption variables are recorded. Spent grain flow rate and air injection for dense phase conveying are controlled. Safety functions, such as overpressure and dry running, are monitored and secured. Parameters can be adjusted by remote control from a superior control system or locally using the Touch Panel of the SAI controller.

CONNECTED SERVICES

The cloud platform – SEEPEX Connected Services – links intelligent products, services and processes. Access the digital twin of your pump from anywhere, at anytime and from every mobile device to view operating and performance data along with information about fluctuations or changes. All collected data is safely and securely saved in the cloud to enable targeted data analysis. Operating data, such as temperature or pressure, is available anytime and anywhere, offering increased productivity and reduced energy consumption for your SAI system.

FULL PERFORMANCE

Smart Air Injection offers unprecedented performance when conveying abrasive and highly viscous spent grains. With this innovative combination of various conveying and control technologies, substantial operational expenses savings by minimum air consumption can be achieved.

KEY FACTS

- Conveying capacity:
0.5–30 m³/h
- Pressure:
up to 4 bar
- Pipework length:
up to 1,000 m
- Wetness-content of spent grain:
60–85%
- Speed:
30–150 rpm



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