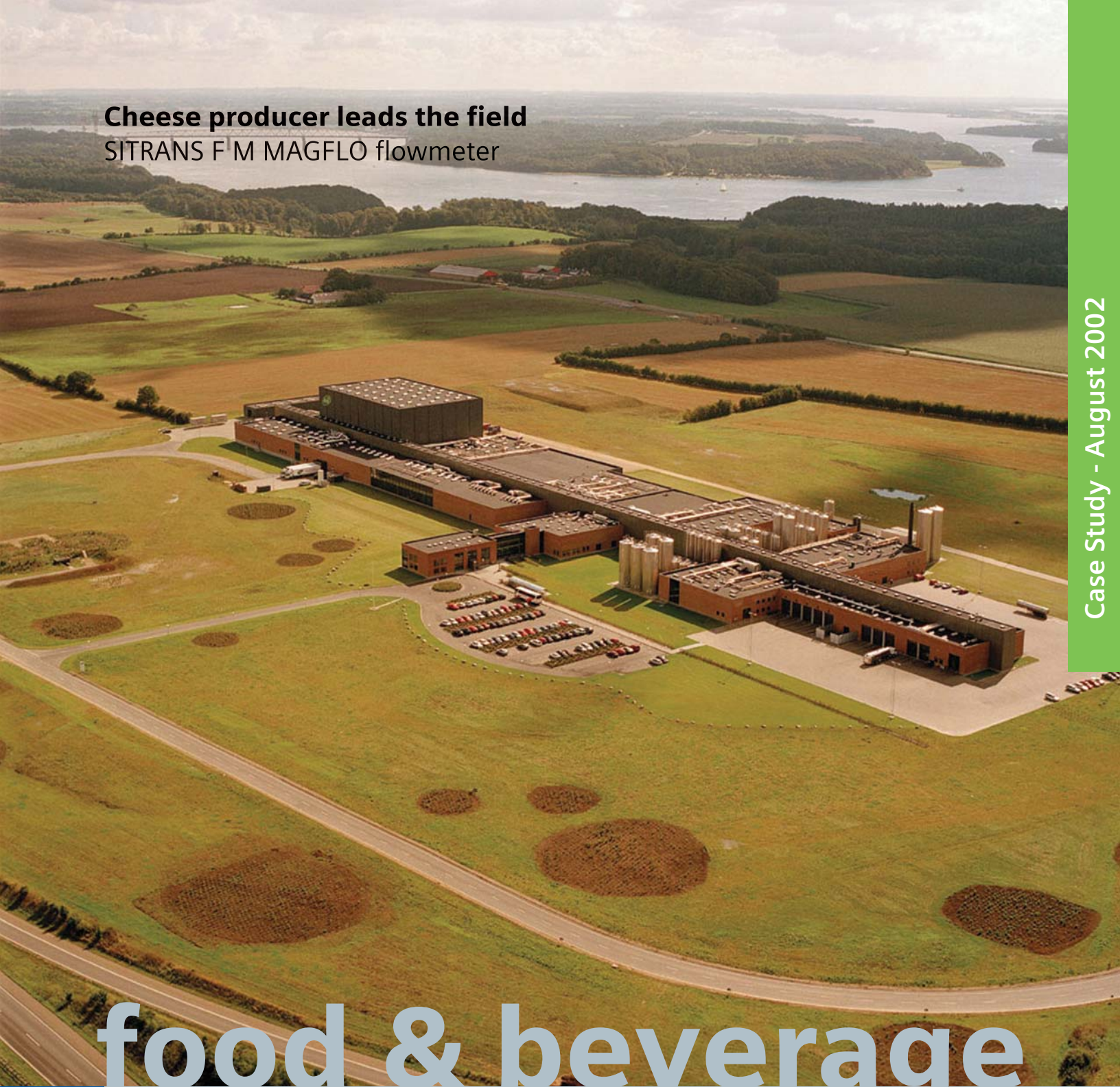


Cheese producer leads the field
SITRANS F M MAGFLO flowmeter



Case Study - August 2002

food & beverage

Arla Foods' extensive new cheese dairy in Taulov near Fredericia, Denmark, is equipped with the very latest in processing plant - which includes SITRANS F M MAGFLO electromagnetic flowmeters from Siemens Flow Instruments AIS.

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Taulov Dairy in brief

Taulov Dairy covers about 30,000 square meters of production buildings. Building work started in June 1998 and production began in October 1999. By October 2000 production had reached full capacity, corresponding to 25,000 tons of yellow hard and semi-hard cheese per year.

The dairy employs about 140 people and production is automated in batch-controlled sequences of 22,000 litres of milk per batch — a precondition to guarantee the traceability that large European grocery chains demand of finished wares.

The dairy is certified in accordance with the ISO 9001 standard and also complies with the requirements of the HACCP system.

Taulov Dairy functions as a model company for the EMP project (energy and environmentally conscious project work) - a demonstration project performed in association with the Danish Energy Agency. The EMP work has resulted in electricity, water and gas savings amounting to DKK 8 million per year.

The capital budget for the dairy was DKK 500 million of which about DKK 50 million was used to optimise resource consumption. On this background, the calculated average pay-back time for the net additional investments becomes 4.5 years.

The process and supply equipment includes about 150 Siemens SITRANS F M MAGFLO electromagnetic flowmeters.

Dairy produce is a highly competitive sector of the food industry and is marked by internationalisation and ever-growing economic power concentration.

In such a situation no company can survive on reputation and home-market advantages. On the contrary — raw materials and costs are relatively high, while sales prices are under constant market pressures.

Arla Foods – the result of a fairly recent merger between MD Foods of Denmark and the Swedish company Arla – also faced this situation when in 1997/1998 project work began on a new cheese dairy in Taulov near Fredericia in Denmark.

With an annual production of hard and semi-hard yellow cheese set at 25,000 tons, the objective was to establish one of Northern Europe's largest and most modern cheese dairies.

To ensure the desired degree of competitiveness, the following main goals were defined right from the start:

- to produce a wide assortment of yellow cheeses
- to optimise quality
- to produce efficiently and rationally
- to minimise the consumption of resources: water, electricity and gas
- to ensure a good working environment

This ambitious set of goals was an underlying factor in every decision made regarding the new plant, including of course the selection of new equipment for production processes and supply services. The criteria were clear, equipment had to contribute markedly in optimising product quality, efficiency, resource consumption or the working environment. If it could help optimise all four, so much the better.

Taulov Dairy - The building work started in June 1998 and production began in October 1999



An exceptional cleaning concept

The list of innovative systems installed to meet these demands at Taulov Dairy is long. A good example is the cleaning equipment.

The internal cleaning of tanks, process equipment and piping is performed using automatically controlled CIP (Cleaning In Place) systems. These are programmed on the basis of timed sequences, temperature, the concentration of cleaning agents, liquid velocities, etc.

There is a total of eight de-central CIP plants, controlling 140 cleaning routes. The expected rate of cleaning per route is between once and twice every 24 hours and all cleaning programmes are monitored by a central computer.

Cleaning typically accounts for 30-40 percent of the heat consumption and 50-60 percent of the water consumption at the dairy, even with this advanced system. At Taulov the quantities just named are kept down in several ways, including the use of collecting tanks so that hot cleaning liquids as well as some of the flushing water can be regenerated.

In combination with cleaning routines adapted precisely to suit each individual application, this design of CIP plant has

resulted in a reduction of heat and water consumption of about 15 percent in relation to other advanced installations.

In addition, frequency-controlled pumps and energy-saving motors have helped reduce the consumption of electricity used for cleaning by about 30 percent.

The flowmeter challenge

An important part of the CIP control at Taulov Dairy is looked after by Siemens SITRANS F M MAGFLO electromagnetic flowmeters, type MAG 1100 FOOD.

Among other things, these meters ensure that cleaning agents are dosed accurately, that they are circulated at the correct velocity, and that systems are completely emptied again.

The demands imposed on the flowmeters are therefore high measuring accuracy combined with good long-term stability, the capability of withstanding often rapidly changing process conditions such as momentary temperature and velocity variation, and changeovers between basic and acid cleaning agents, etc.

Flow-proportional output signals from the flowmeters are used at many points as regulating signals for the frequency converters that drive the pumps in the CIP systems. The result is the energy-optimum utilisation of very many motors.



SITRANS F M electromagnetic flowmeters are designed to meet the challenges in the tough environment of the food and beverage industry where extreme temperature changes, humidity, condensation, hose-down and CIP cleaning are ever present.

Tanks with CIP cleaning



From whey to water

At Taulov Dairy, several production processes combine known technology with newly developed production methods. A good example within membrane filtration is whey concentration.

Whey is the approximate 90 percent of the milk that remains after curdling. It is pasteurised and centrifuged to separate fat, after which the whey protein is separated by ultra-filtration for further processing.

The residual product from this process is then hyper-filtered to separate lactose, milk proteins (suitable for animal feed and in food production) and RO-water. This water is so pure that it can be used for cleaning.

The annual extraction of whey at Taulov Dairy amounts to 250 million kg. From this, about 125,000 cubic metres of RO-water is produced and re-used — a significant contribution to raw water consumption saving. The large quantities of liquid involved in whey processing flow through SITRANS F M MAGFLO electromagnetic flowmeters, type MAG 1100 FOOD.

These are used to control and regulate the membrane filtration process, i.e. one meter is installed ahead of the filtration columns and another at the outlet of each column (see photo in the bottom right corner).

In this way, the process is continuously monitored to further ensure optimum operation.



SITRANS F M electromagnetic flowmeter installed in the water supply.

MAG 1100 FOOD flowmeters installed in the concentration plant for the curdling process.



MAG 1100 FOOD flowmeters installed in the membrane filtration plant for whey processing.

