

APPLIED ENGINEERING TECHNOLOGY

Dairy factories fall for a magnetic attraction

What am I? I can extend your equipment run times, reduce CIP costs and improve product quality.

Need more hints? I can be installed without interrupting product runs - there is no need for electrical connections or cutting into equipment. Once installed I don't need renewal or maintenance.

I'm not a miracle, I'm a magnetic device specially developed to reduce fouling in evaporators, pasteurisers, direct steam injectors, and other dairy manufacturing equipment.

About two years ago **Ray Page**, from P S Australian Promotions Pty Ltd. trading as Magnetic Technology, approached **Wayne Kelly**, research and development co-ordinator at Bonlac with a device which he said would help reduce scale and build-up on equipment pipe walls.

Although interested in any device which may reduce the cost and trouble involved in cleaning pipes, Mr Kelly was a little skeptical at first.

Some companies had tried electromagnets but found they imparted a charge, causing electrolysis which led to corrosion of their equipment, he said.

However, Mr Kelly has found that this magnetic device does not create an electrical field, has not caused corrosion, has had no detrimental effect on the product and has done much of what Mr Page said it would.

The magnets have been installed on evaporators at the Bonlac plants at Stanhope, Longwarry, Camperdown and Cororooke and at Murray Goulburn's Maffra plant.

"We have only targetted the problem areas at this stage," Mr Kelly said. In these areas there is a tendency for continuing blockages and build-ups, mainly when evaporating high-heat or whey powders.

"We've picked the worst areas and if we get minor improvements then we expect fairly large improvements in the less problematic products such as full cream powder and skim milk powder."

The device was working, he said, but

at different levels on different evaporators.

"Our runs on whey are now three to four hours longer and cleaning is more effective."

Mr Kelly said the main benefit was in keeping the system clean while it's running and therefore maintaining operating efficiency because build-up on pipe walls decreased the rate of evaporation.

Cost factors

He said the cost of the magnetic device depended on a number of factors including the capacity of the evaporator and the size of the pipes because the device worked on flow rate and projecting the magnetic force to the pipe centre.

Costs can vary from about \$7000 to \$8000 for a small evaporator and up to \$25,000 for a large 40,000+ litres an hour evaporator, he said.

Basically, you locate the evaporator's major fouling areas and attach the magnets to those pipes. The device clamps on the outside of the pipe.

"The magnets align the calcium carbonate particles in the fluid, they form larger crystals and so can't fall out and burn onto the side of the pipe."

You don't get the hard build-up which



Wayne Kelly

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requires six-hour washes, physical removal and the loss of production time. You still get build-up but it is soft and easily removed by the normal three-hour wash.

The magnetic effect that is generated is not permanent, and once the fluid moves for some distance or through a pump or some turbulence the effect is destroyed, so multiple magnetic sets may be required.

"On a 30,000 litres/hour evaporator we use five to six magnetic sets," Mr Kelly said.

Murray Goulburn's Maffra plant has been trialling the magnetic devices for about four months on its evaporator making a variety of powders including whole-milk and heat stable, high-heat powders.

"We've certainly decreased the amount of milk stain in the collandrias quite significantly and have been able to increase run times by anything up to 50%," said the plant's branch manager, **Ken Thomas**.

The real test was going to be in the spring when fresh milk started coming through because at this time of year the milk was pretty stable and didn't produce much build up anyway, he said.

Mr Thomas said they had also been able to reduce the amount of acid cleans on the evaporator but evaluation of this had only just begun.

The devices cost about \$25,000 for the plant's 38 tonnes an hour water evaporator, Mr Thomas said.

Mr Page, from Magnetic Technology, said he was trialling the devices to test their value for membrane applications.

While trials on full cream milk and skim milk evaporators had led to some production runs of longer than 40 hours, he said.

According to Mr Page, the devices are not ordinary magnets. They have been specially designed to suit the requirements of the dairy industry. Some of the material used in manufacturing the devices is not readily available and has to be sourced from overseas.

The payback period varied from a number of weeks to a number of months depending on the product, but was certainly less than one year, he claimed.

Overseas orders for the device have been placed with Mr Page's company and the first shipments left in April.