A Quantum Leap in Australia

REMONDIS Takes Over Thiess Waste Management
For many years various Australian authorities have been slowly installing water-fluoridation plants in a general endeavour to promote dental health. In the last few years, though, the pace of fluoridation has quickened as various states have introduced fluoridation programs, backed by state government subsidies. Queensland, for example, decreed in 2006 that 90% of Queenslanders would have access to fluoridated water by 2012.

ProMinent Fluid Controls Pty Ltd has supplied more than 60 fluoridation systems over the past 25 years. Many of the earlier installations were for rural water supplies in relatively small water treatment plants. Initially, 25 kg bags of sodium silicofluoride powder (Na2SiF6) were manually loaded into a hopper; later installations used a vacuum loader designed by ProMinent. A dry chemical feeder meters the Na2SiF6 into a mixing tank of water, where it is dissolved before being added to the water supply. (Other chemicals used for fluoridation are sodium fluoride powder and hydrofluosilicic acid).

For plants of this size, ProMinent has designed a fully automated process in which the Na2SiF6 is completely contained in a sealed transfer system from the time it is received until the moment it is put into the mixing tank. Sealing is important for dust control, because the plants use up to 875 kg/d of Na2SiF6, which is toxic and subject to strict regulatory control. Bulk bags of Na2SiF6 are unloaded into a transition or floor hopper, from which a flexible screw conveyor transfers the material to a storage hopper that feeds the mixing tank.

The transition hopper is small, with a capacity of only 60 l. In contrast, storage hoppers may be as large as 8,750 l or more for a 750 MLD plant, and designed to hold up to seven days’ supply of Na2SiF6.

The major pieces of equipment are the bulk bag discharger, a dust containment system, and the flexible screw conveyor, all supplied by Flexicon Corp. (Australia) Pty Ltd., Brisbane. Bulk bags of 1,000 kg are lifted into place on the discharger frame by an electric hoist and trolley on a cantilevered I-beam. Powder is discharged from the bag into the

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transition hopper through a double-wall Tele-Tube™ telescoping tube. The tube is secured to the bag spout by a patented Spout-Lock™ clamp ring that creates a dust-tight seal, while the bottom of the tube is connected to a collar in the lid of the sealed hopper.

The clamp ring, in the open position, is raised pneumatically to the bag spout. The spout is pulled over the rim of the tube’s inner wall and the ring is locked in place over it. At this point the pneumatic pressure that raised the tube is released, causing the telescoping tube assembly to exert downward pressure on the spout. The continuous downward pressure on the bag keeps the spout taut at all times and helps maintain a steady flow by preventing excess material in the spout from bulging outward and creating dead spots, or falling inward and restricting the flow.

The double-wall telescoping tube is a key element in the entire system, says McKee. In this design, errant particles are drawn into the dust collector through an annular gap that encircles the bag spout seal. “This is the only way to go to obtain extra protection against dust leakage,” he says.

Flexicon’s Bag-Vac™ dust collection system is activated prior to connecting the telescoping tube to the bag. The system, attached to the discharger frame, conveys dust pneumatically to a water trap tank. Once the clamp ring has been secured, the dust extractor is turned off and the spout drawstring is untied, allowing the powder to flow into the transition hopper.

The dust extractor remains inactive throughout the unloading process. However, air displaced by the flow of material exits via the dust collection system. A filter prevents Na2SiF6 from being entrained in the outflowing air.

A special feature of the unloader unit is a pneumatic Power Cincher™ flow control valve that can close the bag at any time, so that a partially empty bag can remain in place until more material is needed. This is important for the fluoridation plants, which use approximately 120 kg/d of Na2SiF6 per 100 MLD of water. The cincher also helps to keep moisture out of the bag and can isolate the bag in the case of an emergency.

For further information, please contact, Flexicon Corporation (Australia) Pty Ltd Ph: 07 3879 4180 or visit the website: www.flexicon.com.au

Double wall Tele-Tube™ telescoping tube provides extra protection against dust leakage during transfer from the bag. Tube is secured to the bag spout by a Spout-Lock™ clamp ring that creates a dust-tight seal.