MEDIGLOVES LIMITED

Recovery and Reuse of Drainage from Wash and Chlorination Process

SUMMARY OF THE OPTION

Medigloves Limited is a Thai producer of more than 70 million pairs of quality surgical and cleanroom latex gloves per year for the domestic and international market.

The company uses nearly 500 m^3 water and discharges more than 420 m^3 to an offsite wastewater treatment plant. A lot of water is generated during the washing of gloves after the chlorination process, and all this water was sent to treatment. It was found that water from the first and second rinse of gloves was too contaminated with chlorine, but that water from the third rinse and onwards was clean enough for reuse. This water amounted to approximately 29 m^3 per day and is now recovered in a collection tank for reuse to flush toilets and watering gardens and lawns.

Investment costs were US$ 5,250 to install bypass valves, pipelines and a collection tank to transport and collect drained water from the third rinse onwards. The company saves US$ 5,406 per year and the payback period was less than one year. Every year, 24,545 kWh electricity and 9,744 m^3 water are saved. In addition, more than 15 tons of CO_2 emissions are mitigated per year.

A similar option was implemented for the dipping process (*see separate case study).* Since implementing these options the company is looking into other ways to recover and reuse the remaining drained hot water from the dipping process and wash and chlorination process. If successful, the company could save up to 32,000 m^3 per year and thousands of dollars in the future.

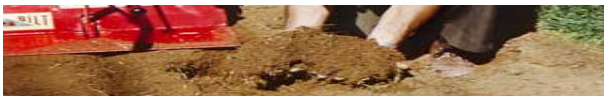
KEY WORDS

Chemicals, Thailand, Electricity, Water Recovery, Water Conservation

OBSERVATIONS

Producing medical gloves requires a lot of water. Medigloves consumes nearly 500 m^3 of water for its daily production processes. Of the water used, more than 420 m^3 is discharged to the wastewater treatment plant every day. More than 100 m^3 per day is drained water from the dipping process and the wash and chlorination process, and is relatively clean water.

The wash and chlorination process was further investigated because of the high quantities of water discharged. After the chlorination process, latex gloves are washed/rinsed with clean water several times depending on customers' reference standard (for example, some customers require gloves to be washed five times). All water used for washing/rinsing is discharged to the water treatment plant.



Some of this water may be clean enough for reuse. If clean water is unnecessarily sent to the wastewater treatment plant, then this causes significant losses of treatment chemicals and electricity, costing the company thousands of dollars each year.

OPTIONS

The Team proposed to collect hot water drained from the washing machines after the chlorination process in a storage tanks for reuse. The technical feasibility analysis of this option found the following:

- Laboratory tests found that the water from the first two rinses after the chlorination tanks was to contaminated with chlorine for it to be reused, and this therefore continues to be sent to the wastewater treatment plant. Laboratory tests confirmed that water from the next rinses has low enough chlorine levels and is not contaminated with other chemicals and is therefore suitable for reuse
- The limited area between the different tanks and equipment made it difficult to attach drainages guards/pipes to all water tanks
- The amount of water from the third and subsequent rinses that could be collected for reuse is 29 m^3 per day
- The implementation required the construction of a new 18 m^3 storage tank to collect drained water from the washing process, and attaching bypass valves to the drainage pipes of wash tanks to separate high and low chlorine water. Low chlorine water would be sent to the storage tank. The operation of the bypass valves can be done manually, but it is easy to install equipment (e.g. a solenoid valve) for automatic control of the valve.
- Water could be reused for flushing toilers and watering the gardens/lawn.

RESULTS

Financial benefits

- Investment: US$ 5,250 for the new tank and modification of drainage pipes
- Annual operating costs: not provided
- Annual cost savings: US$ 5,406, calculated as follows:
    - Annual electricity cost savings: US$1,411 (= 24,545 kWh X 0.0575 US$/kWh)
    - Annual water and chemical costs savings: US$ 3,995 {= 9,744 m^3 water savings X (0.26 US$/$m^3$ water + 0.15 US$ for chemicals per m^3 wastewater treated)}
- Payback period: less than one year (= 5,250/5,406)

Environmental benefits

- Annual water savings: 9,744 m^3 (29 m^3/day X 336 operating days)
- Annual electricity savings: 24,545 kWh, Calculations are as follows:
    - Electricity used for water 2.519 per m^3 water (= 0.759 kWh/ m^3 to lift water from the well + 1.76 kWh/ m^3 to treat wastewater)
    - 2.519 kWh X 9,744 m^3 water saved = 24,545 kWh per year
- Annual GHG emission reductions: 15 ton CO_2/year (= 24,545 kWh X 0.000618 tonCO_2/kWh)

FOR MORE INFORMATION

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