RECP Best Practice Catalogue

Optimization of CIP

Developed within the framework of MED TEST II

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

switchmed

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Best Practice - Optimization of CIP

SECTOR:	**Food & Beverage**
SUBSECTOR:	Manufacture of soft drinks; production of mineral waters and other bottled waters
PRODUCTS	Soft Drinks
CATEGORY	Process control or modification
APPLICABILITY	Utilities

COMPANY NAME	---
COMPANY SIZE	Large

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Description of the problem (Base scenario):	Due to manpower faults, excess amount of water may be consumed to wash out the product from the tanks and pipes during the semi-automatic open CIP of the production lines. This fault mainly affects the time needed for CIP and reduces production efficiency and yield.
Description of the solution	The following two measures were proposed: 1) **Use sensors to shut off rinse water as soon as the product has been washed out** Sensors are recommended to be used to provide an indication/alarm when the contents of tanks and pipes are not product but water. 2) **Use sterilized compressed air at 3 bar to purge the residues** To reduce the materials lost in pipes, and water used for rinsing, sterilized compressed air could be used to push down the products in the pipes before starting the CIP. Note: These two measures can be implemented together to save materials and water, since the use of compressed air is not enough to purge all the residues and water rinsing is still needed, so the existence of sensors will control the time of water rinsing and save water and electricity.

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Economic Benefits	**1) Use sensors to shut off rinse water as soon as the product has been washed out** Increase of production efficiency and yield by more than 1,300 Euro per year is expected by the production manager and involved technicians. It will save electricity consumption by 5 minutes per cycle (30 minutes); 5/30 * 6 kWh/cycle * 4 cycles/day * 300 days/year * 0.12 Euro/kWh = 144 Euro/year. At the same time it will save water consumption by 5 minutes per cycle (30 minutes); 5/30 * 5 m^3/cycle * 4 cycles/day * 300 days/year * 2 Euro/m^3 = 2,000 Euro/year. **Together measure 1) saving 3,444 Euro/year (16%)** **2) Use sterilized compressed air at 3 bar to purge the residues** Save 50 % of raw materials and 2 m^3 of water per cycle for 4 cycles/day and 300 days/year. As per the provided information in the MFCA assessment, saved materials = 50% * raw materials NPO; Saving= 16,400 Euro/year (50%) Saved water = 2 * 4 * 300 * 2 Euro/m^3 = 4,800 Euro/year (50%) **Together measure 2) saving 21,200 Euro/year (50%)** **Total saving= 24,644 Euro/year**
Environmental Benefits	1,200 kWh electricity/year 20.5 ton/year of raw materials 3,400 m^3 water/year 218 kg/year of BOD_5 394 kg/year of COD 0.7 ton CO_2/year
Health and safety impact	-------

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Capital investments & financial indicators	Investment= €5,000 Payback period= 0.2 year
Suppliers	Local
Other aspects	------
Implementation	Implemented.