RECP Best Practice Catalogue

Water efficient product cooling

Developed within the framework of MED TEST II

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

switchmed

The SwitchMed Programme is funded by the European Union

Best Practice - Water efficient product cooling

SECTOR:	**Food & Beverage**
SUBSECTOR:	Processing and preserving of meat and production of meat products
PRODUCTS	Cold Cuts – Mortadella, Roast, Luncheon
CATEGORY	Process control or modification
APPLICABILITY	Process

COMPANY NAME	---
COMPANY SIZE	200 Full time employees and Turnover of 4.254 million EUR / y

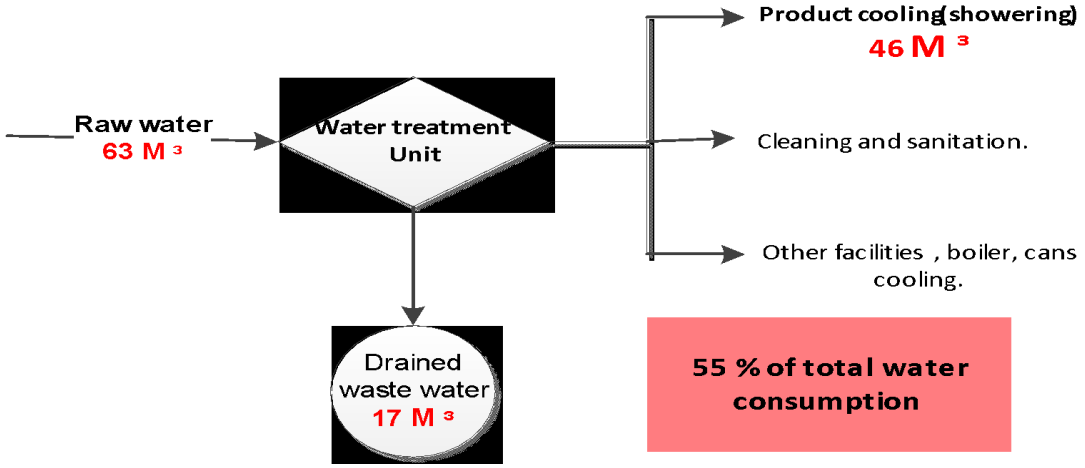
Best Practice - Water efficient product cooling

Best Practice - Water efficient product cooling

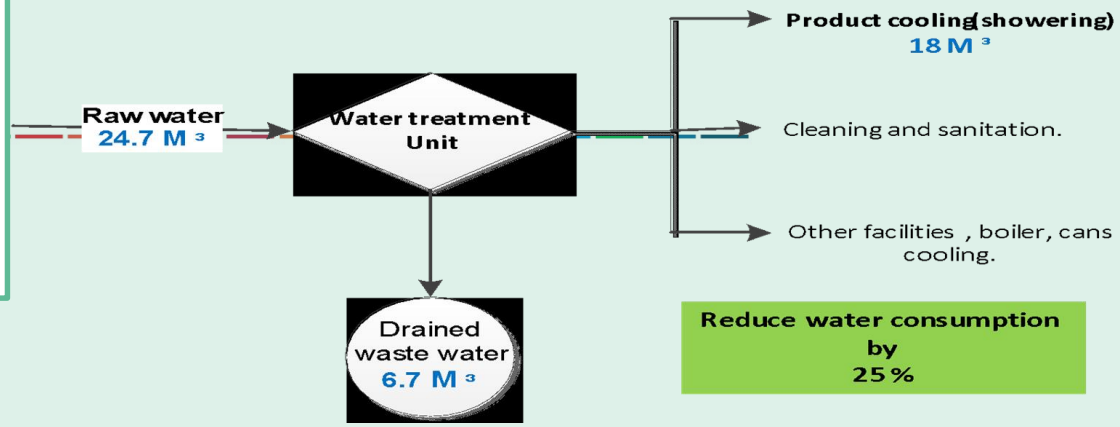
Description of the problem (Base scenario):	The cooked products are cooled down by water showers. Company-wide water balance showed that water consumption of the cooling showers amounts to 55% of the company total water consumption which is 106 m^3/day. The water used for cooling should be treated because the municipal water from the grid contains high amounts of salts like calcium and magnesium that would appear as white spots on the external surface of the products. Consequences of this water treatment for total losses of water are showed on the next slide.
Description of the solution	Company optimised the cooling process mainly by reducing the target temperature to which the goods are cooled down (from 30 to 60 degrees). This led to significant reduction of cooling time (depending on size of product) and reduction of water consumption. Company defined new target temperature for cooling its goods through repeated experiments without affecting the safety and quality of the product. This simple measure resulted in saving around 50% of total water consumed in the old cooling process which represents 25% saving in the total amount of water consumed by company. Also the amount of water which needs initial treatment at the company boundary will be reduced by factor 1.27 as a result of reducing water consumption for product cooling. This is explained in more detail in the following slide.

Description of the problem (Base scenario):

Due to the need for the initial water treatment company loose from each m^3 of treated water 270 l of water on the input to the company. This loss has to be considered in calculating NPO and it influences total water consumption related to each water uses in the company. This means that if the cooling showers originally consumed 46 m^3 per day, the total related water consumption was 63 m^3 per day (leading to waste water generated in the water treatment unit 17m^3/d). The same apply for water consumption after implementation of saving measures. For covering the reduced water consumption 18 m^3 per day is needed 24,7 m^3 per day treated water (and its loss in the water treatment unit is reduced to 6,7 m^3/d).

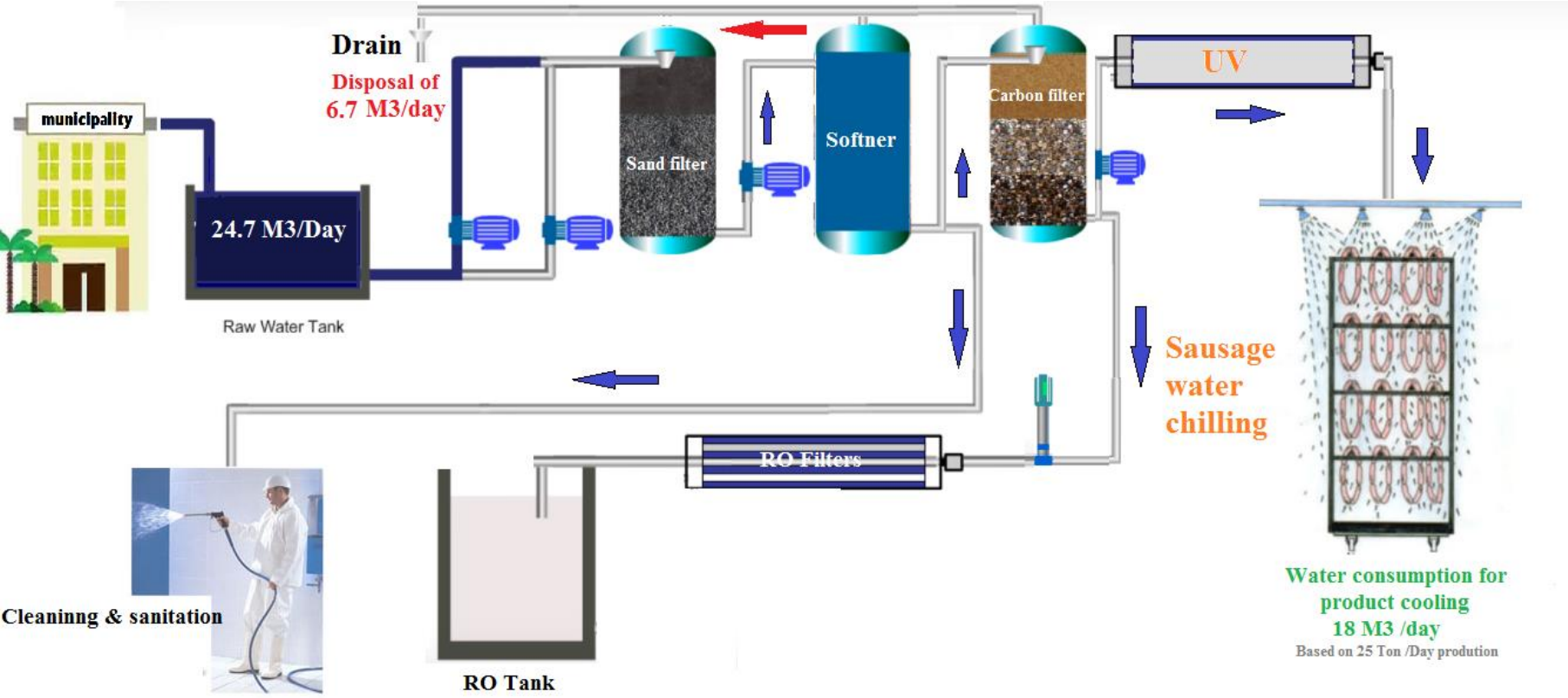


Description of the solution



Scheme for company water balance

Numbers are after implementation of measure for water efficient product cooling



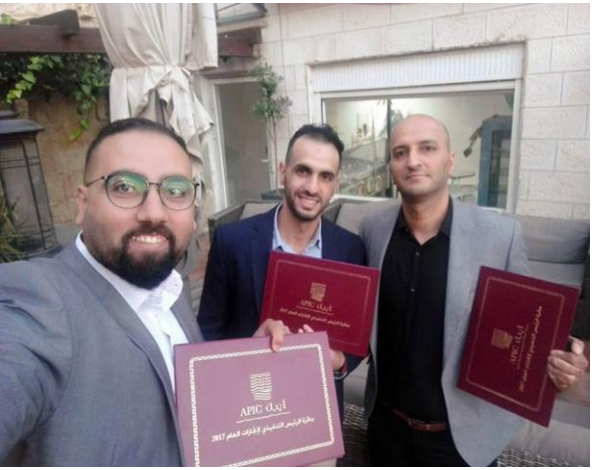
Best Practice - Water efficient product cooling

Economic Benefits	Specification of water savings : • the water consumption for cooling by showering was reduced from 46 m^3/day to 18 m^3/ day based on production of 25 ton/day of meat products • Total amount of water saved including losses in the water treatment unit represents 38.3 m^3/day or 11,457 m^3/year • This leads to operational savings: 15,490 EUR/year **TOTAL Savings: 15,490 EUR/year**
Environmental Benefits **Health and safety impact**	• Environmental saving of 11,457m3/year of water

Best Practice - Water efficient product cooling

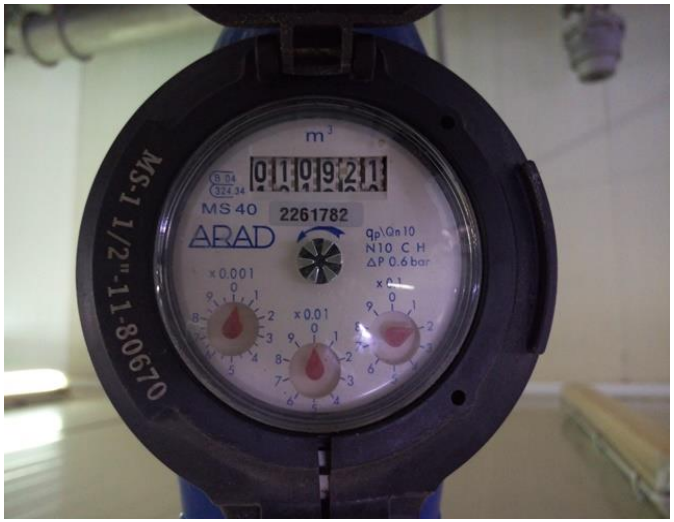
Capital investments & financial indicators	• Zero Capital investment • Immediate Payback period
Suppliers	N.A

Other aspects	• **Increase of production capacity :**
	  • Improvement of movement of trolleys with product.
	  • Increase in cooking , holding and cooling capacity.
	• **Capacity Building Benefits:**
	  • This project raised company awareness on the importance of water savings both from an economic as well as an environmental perspectives. The staff at the company has a skill and guidelines how to continue with continuous increase of water efficiency in each work place in the plant. The results and experience from the project were shared in detail with Production, R&D and Maintenance departments.
	  • Three company TEST team members won the CEO award for this measure in form of certificate and money reward provided in a company festival.
	• **CEO Award**



Best Practice - Water efficient product cooling

Implementation	Water consumption is also reduced by 25% from the total consumption in the company. As part of the saving measure there was installed flowmeter for monitoring water consumption in cooling the sausages. Sample of monitoring results is provided in the next slide.



Monitoring water efficiency on daily basis

Examples of measurements of Operational Performace Indicator for water efficiency of cooling process using watermeter installed at the cooling proces (in cubic meters) and records of daily production (in tons)

Sep-17	Average daily consumption	24.54
	Average Daily production (ton)	24.9
	Total average daily water consumption in showering process (Cube/ ton)	0.99

Oct-17	Average daily consumption	21.2
	Average Daily production (ton)	24.9
	Total average daily water consumption in showering process (Cube/ ton)	0.85

Nov-17	Average daily consumption	16.3
	Average Daily production quantity (ton)	22.0
	Total average daily water consumption in showering process (Cube/ ton)	0.74

Dec-17	Average daily consumption	19.78
	Average Daily production quantity (ton)	21.72
	Total average daily water consumption in showering process (Cube/ ton)	0.91

Jan-18	Average daily consumption	17.04
	Average Daily production quantity (ton)	21.25
	Total average daily water consumption in showering process (Cube/ ton)	0.80

Remark:

These records show that the average water consumption during the 5 months was 0.86 m^3/ton. The variation of this indicator is given by the fact that the consumption ratio does not depend on the quantity only but it depends also on the type of products (their weigth, shape and surface).

Development of OPI for water efficiency of cooling showers

Objective: Increase water efficiency
OPI: Water consumption in m^3 per t of product (m^3/t)

Situation	Target Temp.	Water for cooling consumption (m^3/Day)	**OPI: Total actual treated water consumption generated by the cooling process (m^3/ ton)**	Total water consumption including water discharged from water treatment unit (m^3/Day)	OPI: Total water consumption generated by the cooling process (m^3/ ton)
Baseline situation before RECP	< 30 ℃	**46**	**1.84**	**63**	2,52
First Saving Project	< 50 ℃	30	**1,20**	41,1	**1,64**
Second Saving Project	< 60 ℃	18	**0,72**	24,7	**1,0**