

RECP Best Practice Catalogue

Improve the performance of the cooling system
Developed within the framework of MED TEST II



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



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Best Practice - Improve the performance of the cooling system

SECTOR:	Food & Beverage
SUBSECTOR:	Manufacture of other food products
PRODUCTS	Baby milk
CATEGORY	Good Housekeeping
APPLICABILITY	Utilities
COMPANY NAME	---
COMPANY SIZE	Medium

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Description of the problem (Base scenario):

The actual energy performance of chillers was analysed focusing on cooling capacity, cooling load and coefficient of performance (COP). It appeared that the COP is lower than the minimum acceptable value (3.5) due to the low efficiency of the compressor and the un-shaded chiller's condenser. High air temperature at the suction area due to lack of ventilation is responsible for the high energy consumption.

Value of COP 2.3 was calculated based on measuring the COP parameters (chilled water flow rate, supplied water temperature, returned water temperature and input power).

Description of the solution

Periodical maintenance and relocation of the chillers will improve the chiller's compressor and condenser efficiency.

Periodic maintenance is needed for the chiller as follows:

- 1- check the well operating of condenser fans.
- 2- check that the condenser fins are clean.
- 3- check the Refrigerant charge in the refrigeration cycle .
- 4- check the well operating of the compressors.
- 5- check the water strainers.
- 6- check for any water leakage.
- 7- check the thermal insulation on the evaporator and chilled water network.
- 8- check the well-operating of the expansion valves.
- 9- Install shade above the condenser that will eliminate the direct sun radiation which affects the heat rejection in the condenser.
- 10- Relocate the chiller suction or make a long suction duct to avoid warm air returning to the suction.

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Economic Benefits

COP old: 2.3
COP new: 3
Saving %: $(\text{COP}_{\text{new}} - \text{COP}_{\text{old}}) / \text{COP}_{\text{new}} \%$
Saving: 23.12%
Saving: 23.12%* 153,920 kWh/yr (annual chiller cons.)
Energy Saving : 35,582 kWh/year

Annual Saving: € 4,540/ year

Environmental Benefits

Energy use and emissions reduced by 23.12%

Energy Saving is : 35,582 kWh/year

Reduced CO₂ emissions: 19.9 ton/year

Health and safety impact

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Capital investments & financial indicators	Investment= €650
	Payback period= 0.1 year
Suppliers	---
Other aspects	---
Implementation	Under implementation