

RECP Best Practice Catalogue

Cooling/temperature control of silos
Developed within the framework of
MED TEST II



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



The SwitchMed Programme is
funded by the European Union

Best Practice - Cooling/temperature control of silos

SECTOR: Food & Beverage

SUBSECTOR: Bakery and farinaceous products

PRODUCTS Semolina, Flour, Couscous, Pasta

CATEGORY Process control or modification

APPLICABILITY Process

COMPANY SIZE 400 employees



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TEST Training kit

Best Practice - Cooling/temperature control of silos

Description of the problem

(Base scenario):

Currently, there is no temperature control in the silos; there is no cooling and no thermometers.

Once a month the grains are transferred from one silo to the other for ventilation. There is the risk of:

- Losing product to loss by fermentation (and loss of quality!)
- Losing product to insect damage (and loss of quality!)
- Silo fires caused by overheating/spontaneous combustion (has already occurred on site)

Fermentation losses during storage of 10,000 tons of cereals at 30 °C for a period of 4 months is about 64 tons.

Description of the Solution

The improvement measure consists of cooling the grains to a temperature below 13 °C to avoid losses and the risk of spontaneous combustion. Cooling is also important to prevent the development of insects and also the development of moulds and their mycotoxins.

Cooling can be achieved with a mobile grain refrigeration unit that can be connected to storage silos and moved from one silo to another. In addition, a temperature control system must be installed in the silos.

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Economic Benefits

For storage of 10,000 tons of wheat at 30 °C for 4 months, material losses from fermentation is € 9,375 (estimated by calculation).
Refrigeration at 10 °C requires an energy of 45 MWh, or an expenditure of € 1,360, but prevents losses.
Net savings are on the order of € 8,015.

Environmental Benefits

A reduction of wheat losses by 64 tons/year

Health and safety impact

Reduction in explosive fires in the silos



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Capital investments & financial indicators	Cost: € 100,000 Return on investment: 12.5 years
Suppliers	Imported
Other aspects	Quality Improvement
Implementation	This measure is not yet integrated into the action plan of the company because it requires supplementary study!