



CONVEYOR BELTS IN FOOD MANUFACTURING



Overview

Conveyor belts are commonly used in manufacturing to move ingredients and finished products around food manufacturing facilities. Conveyor belts can be of any length. They may connect different processes or equipment, which sometimes include through different equipment (e.g., an oven or freezer). Sensors may detect the presence of products on conveyor belts and communicate with motors, but operators can also turn conveyors on and off manually as needed. To evaluate conveyor belts for pollution prevention opportunities, three main areas should be considered:

- **Energy Use:** Conveyor belts are typically powered by motors below the belt, which can operate independently or be connected via programmable logic controls. Conveyors waste energy when they run without products on them, so conveyors should be turned off when not needed. This may occur overnight, on weekends, between batches, or during production slowdowns or stops.
- **Water Use:** Certain food manufacturers may use water on conveyor belts to help ingredients or finished products move smoothly onto and off the belt. Water may also be used to rinse cartons or packaging to remove any residual food or liquid. Due to sanitation and water quality restrictions, the water used on and around conveyor belts cannot generally be reused without filtration or treatment.
- **Waste Generation:** Products or ingredients can fall off conveyors to the floor at transition points or off the sides of unguarded conveyors. Catch pans can prevent waste from falling onto the floor, and any food caught by them may potentially be repackaged, repurposed, or otherwise reused.

The following examples in commercial bakeries and dairy product manufacturing were observed by MnTAP staff members at recent visits to food manufacturers.

About MnTAP

The Minnesota Technical Assistance Program (MnTAP) is a confidential, no-cost, and non-regulatory program at the University of Minnesota that provides technical assistance focused on pollution prevention to organizations in Minnesota.

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Energy Example

NAICS Code: 3118**

Industry Sector:
Bakeries

Pollution Reduction:
15,500 kWh

Cost savings:
\$1,100

Status:
Proposed

At a commercial bakery, MnTAP staff members observed how the conveyor system moves bread from the mixing line to and within the proofer, as well as two motors used to operate the conveyors. In addition, MnTAP staff members noticed how many conveyors were operating without moving products, and the facility's staff members reported that one oven was offline due to production slowdown.

Based on the approximate electricity cost, the total number of conveyors in the system, and the fully loaded efficiencies of the conveyor motors, MnTAP staff members found that turning off unused conveyors could save 15,500 kilowatt-hours (kWh) of energy and \$1,100 annually. Logical controls or similar programming may also be able to cycle conveyors on or off depending on product presence on the belt, which could lead to additional energy and cost savings.

Water Example

NAICS Code: 3115**

Industry Sector:
Dairy Product
Manufacturing

Pollution Reduction:
106,500 gallons of water

Cost savings:
\$500

Status:
Proposed

At a dairy manufacturing facility, MnTAP staff members observed water being sprayed onto a conveyor belt from several nozzles controlled by a manually operated ball valve. Facility personnel discussed how the ball valve is fully opened at the beginning of production and closed at the end of production.

After conducting several trials, MnTAP and facility staff members found that adjusting the ball valve to have a narrower opening would still provide enough water to lubricate the belt. To limit water flow on this supply line, the facility can install low-control orifices (flow restrictors) or other flow-controlling devices, or retrain their staff members on how to limit these flows manually.

Based on the facility's production schedule, approximately 106,500 gallons of water and \$500 could be saved annually by restricting the flow to the ball valve.

Waste Example

NAICS Code: 3118**

Industry Sector:
Bakeries

**Carbon Dioxide
Equivalent Reduction:**
24.6 metric tons

Cost savings:
\$2,500

Status:
Proposed

At a commercial bakery, MnTAP staff members observed how some product was lost to the floor during transitions between production equipment and conveyors, and this product was swept up and discarded with regular trash. MnTAP staff members estimate that up to two 55-gallon barrels of edible waste may have been disposed of in this manner each day.

To minimize product loss, the facility could install guardrails or catch pans and/or train production staff members to watch for and prevent products from falling to the floor. Additionally, edible waste that is currently thrown away could potentially be redirected for use as animal feed.

MnTAP staff members calculated that redirecting this bakery waste could save \$2,500 a year and cut 24.6 metric tons of carbon dioxide equivalent from landfill disposal.