

DELTA T Dryer Control System



DELTA T Dryer Control System Improves Product and Saves Energy

Conventional industrial dryers rely on an “after-the-fact” feedback control system that measures product moisture content at the dryer exit. The DELTA T control system developed by Drying Technology, Inc. with assistance from the Department of Energy’s Inventions and Innovation Program, is a more precise system to control variation in exiting product moisture content. The DELTA T system significantly improves control capability because it measures moisture content continuously before the throughput exits the dryer. It is the only control system with this capability.

The DELTA T unit uses two temperature sensors and an algorithm that relates product moisture content to two factors, the temperature drop of hot air after contact with the product and the production or feed rate. With this algorithm, it is possible to monitor and thus control product moisture before it exits the dryer, a distinct advantage over feedback-type controls. The control narrows the range of moisture between the driest and wettest product exiting the dryer by 33% to 50%. This range allows the average moisture content to be 0.5% to 4% higher. By lowering the variation in moisture content, average moisture content can be higher. This raises production 5% to 35%. Operating at a higher moisture content also lowers energy use by 10% to 20%. Additionally, reducing over- and under-drying improves the product quality.

Benefits

Emissions Reductions

Lower throughput product temperatures reduce the amount of volatile organic compound (VOC) emissions. Reduces emissions associated with fuel combustion by 10% to 20%.

Product Quality

Prevents overdrying and underdrying. Improves color, taste, and texture of food products.

Safety

Eliminates in-dryer fires in forest product drying operations.

Overview

- ◆ Developed by John W. Robinson of Drying Technology, Inc.
- ◆ Commercialized in 1986
- ◆ Over 300 systems operating in the United States, Canada and Columbia
- ◆ Installing 30 units/year as new industrial applications emerge

Energy Savings (Trillion Btu)

Cumulative through 2003	2003
17.5	1.63

Emissions Reductions (Thousand Tons, 2003)

Particulates	SO _x	NO _x	Carbon
0.0	0.0	0.191	25.9

Applications

Industrial dryer control for plywood, lumber, textiles, carpet, food, snack food, plastic pellets, mining, paper, corn wet milling, pet food, oriented strand board (OSB), tobacco, nonwovens, medium density fiberboard, ceiling tile, and chemicals.

Capabilities

Can control a variety of drying systems, including rotary, rotary louver, conveyor, flash, spray, fluidized-bed, and batch lumber kilns.

