

Assuring the Safety of Dairy Products

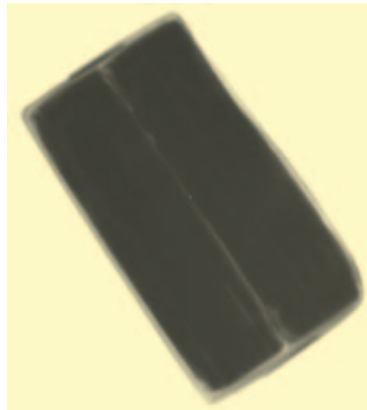
Key Words

- Dairy products
- Food safety
- X-ray

Introduction

Thermo Fisher Scientific's X-ray detection technology enables the dairy industry to meet the more stringent food safety and quality standards with contaminant detection systems and watch for profits with two dimensional fill level detectors. The main advantage of using X-ray technology is the ability to inspect for the final product at the end of the production line, instead of inspecting just the ingredients before packaging. Another advantage is the possibility to calculate for mass, which is directly proportional to the weight of the product, allowing the X-ray system to reject if there is product missing in the package or jar.

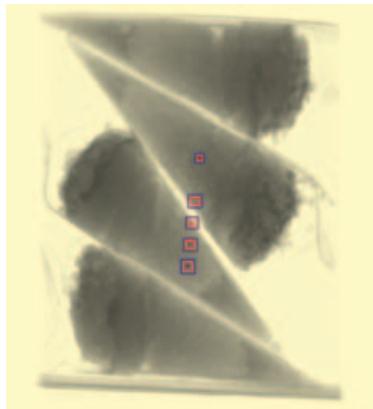
Contaminant detection systems are designed to inspect packaged dairy products like shredded cheese, butter and margarine, ice cream, spread cheese in glass jars and dry milk in metal cans. These systems can detect metal, stone, glass and anything denser than the product itself that could be a constituent for a contaminant.



Butter four-bar pack
(0.8-mm metal contaminant detection)



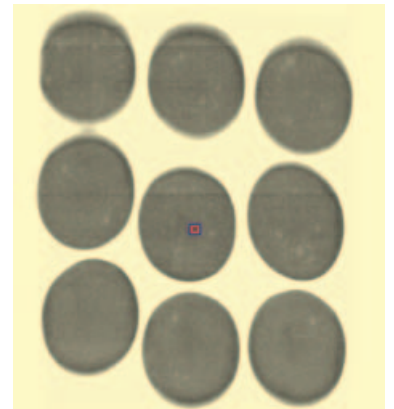
Butter four-bar pack
(missing product detection)



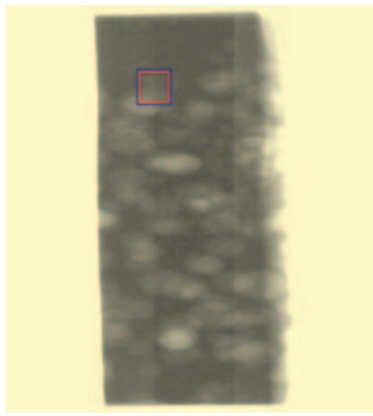
Ice cream cones four-pack
0.8-mm metal contaminant detection



Spread cheese in glass jar
1-mm metal contaminant detection



Yogurt box
1.2-mm metal contaminant detection



Swiss cheese sample
0.8-mm metal contaminant & mass detection

Special Application: Swiss Cheese Grade Selection using X-rays

The United States Department of Agriculture sets the standard for grades of Swiss Cheese or Emmentales Cheese, which nomenclature is divided in Grade A, B, or C and the determination of U.S. grades is based on the following quality factors: Flavor, Body, Eyes and texture, finish and appearance and Color. Our X-ray technology enables the measurement of the eyes or "holes" in the cheese which shall be $\frac{3}{8}$ to $\frac{1}{16}$ inch in diameter for grades A and B, and measure the quantity of them in proportion to the product. And reject the ones with bigger or smaller eyes.

The X-ray system can check for metal contaminants and mass at the same time.

U.S. Standards for Swiss Cheese Grade A

U.S. grade A Swiss cheese shall conform to the following requirements:

1. **Flavor:** Shall be a pleasing and desirable characteristic Swiss cheese flavor, consistent with the age of the cheese, and free from undesirable flavors.
2. **Body:** Shall be uniform, firm, and smooth.
3. **Eyes and texture:** The cheese shall be properly set and shall possess well-developed round or slightly oval-shaped eyes which are relatively uniform in size and distribution. The majority of the eyes shall be $\frac{3}{8}$ to $\frac{1}{16}$ inch in diameter. The cheese may possess the following eye characteristics to a very slight degree: dull, rough, and shell; and the following texture characteristics to a very slight degree: checks, picks and streuble.
4. **Finish and appearance**
 - i. **Rind.** The rind shall be sound, firm, and smooth, providing good protection to the cheese. The surface of the cheese may exhibit mold to a very slight degree. There shall be no indication that mold has penetrated into the interior of the cheese.
 - ii. **Rindless.** Rindless blocks of Swiss cheese should be reasonably uniform in size, and well shaped. The wrapper or covering shall adequately and securely envelop the cheese, be neat, unbroken, and fully protect the surface of the cheese, but may be slightly wrinkled. The surface of the cheese may exhibit mold to a very slight degree. There shall be no indication that mold has penetrated into the interior of the cheese.
5. **Color:** Shall be natural, attractive, and uniform. The cheese shall be white to light yellow in color.

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