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Safe solutions for your industry

Food Safety Modernization Act

Equipment and control designs

The food processing industry which deals with both human and animal food as well as animal feed is one of the most crucial industries around the world. The industry connects countries through the importing and exporting of a necessary good. The United States FDA (Food and Drug Administration) was established in 1906 to protect and promote public health by controlling and supervising food safety, and in 2011 the FSMA (Food Safety Modernization Act) was signed in to legislation providing massive reform for food safety laws in over 70 years. Owners, operators, or agents in charge of a food facility will be required to evaluate the hazards that could affect food within that facility.

Image 1: a food processing plant

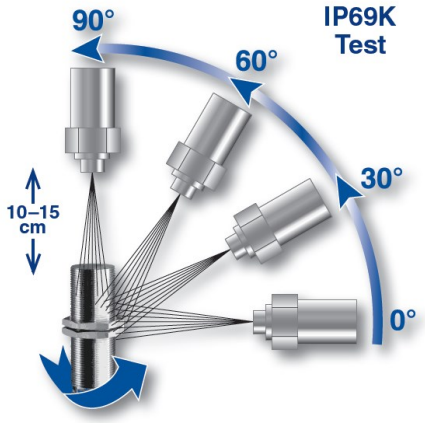
One of the major areas of focus for the FSMA deals with the prevention of bacteria growth as opposed to relying only on the reactive measures of a recall once a foodborne disease has already developed and begun to spread. The CDC (Centers for Disease Control and Prevention) estimates 48 million people get sick, 128,000 are hospitalized and 3,000 die from foodborne diseases each year in the United States. In order to prevent or at least limit these numbers, the FSMA calls for each food facility to implement a written HARPC (Hazard Analysis and Risk-based Preventive Controls) plan and to identify and correct any potential hygienic problem areas. This will essentially force the food industry to comply with similar vigorous cGMP's (current Good Manufacturing Practice) requirements set by Pharmaceutical Quality and Manufacturing Standards.

Image 2: workers on a food packaging line

To assist facilities in meeting these standards several organizations have developed principles aimed at the design of equipment which directly comes in contact with food, as well as the surfaces which do not. Such organizations as NSF (National Sanitation Foundation), AMIF (American Meat Institute Foundation) and of course the FDA themselves. The main goal behind these principles is to prevent the growth and spread of bacteria. According to the USDA (United States Department of Agriculture Food) bacteria grows most rapidly in the range

of temperatures between 40° and 140°F (called the "Danger Zone"), doubling in number in as little as 20 minutes. To sterilize equipment the FDA recognizes 176°F as the minimum wash-down temperature. This same 176°F (80°C) temperature is used within the IP69K ingress protection rating originally designed for construction equipment and outdoor applications and since carried over to pharmaceutical, medical and food processing equipment. In addition to the high temperature requirements, components bearing the IP69K rating must also be able to withstand high pressure of up to 1450 psi.

Typically high temperature and high pressure alone is not enough to fight off the development of foodborne illnesses. In such cases equipment may need to be wiped or washed down with some form of cleaning agent. ECOLAB is an American agency focused on cleaning, sanitizing, food safety and infection control products and services. ECOLAB services industries such as those dealing with foodservice, food and beverage processing, hospitality, textile care, pharmaceuticals, cosmetics, and vehicle wash industries. Among the programs and services offered are the testing and approval of cleaning agents. Products which have been tested in accordance with the ECOLAB Directives are resistant to aggressive cleaning agents and can be used in hygiene sensitive applications.



The IP69K test is designed to insure that the device is able to withstand high-pressure and steam cleaning: The test device sits on a turntable that rotates once every 12 seconds (5 rpm) while a nozzle mounted 10 to 15 cm away spays the device with water heated to 80°C (176°F) and pressurized to 80 to 100 bar with a flow rate of 14 to 16 Liters per min. The test is run with the nozzle at angles of 0° (horizontal), 30°, 60° and 90° (vertical) for 30 seconds each.

Examples of machine controls designed for hygienic applications. They feature smooth surfaces and transitions, IP69K rating, and/or ECOLAB approved materials. Other considerations include use of stainless steel or blue colored components that are easily identifiable if they fall into food lines.

To further combat the growth of bacteria, under US regulation equipment including the safety devices and control buttons on the equipment that comes in contact with food being processed must not contain any shallow recesses. According to AMI 2003 7.1 "[*Human]/Machine interfaces such as push buttons, valve handles, switches and touch screens, must be designed to ensure product and other residues (including liquid) do not penetrate or accumulate in or on the enclosure or interface.*" Thus they must have zero dead leg. AMI also states that surfaces near the product contact zone areas must be designed as if they were product contact zone areas so "*buttons on control panels must be easily cleaned and sanitized during operations in order to not create a microbial harborage*." NSF 5.1 has a similar requirement where equipment is designed to be constructed and maintained in a cleanable condition to prevent the ingress, survival and multiplication of microorganisms.

The Food Safety Modernization Act aims to hold the entire industry accountable "from the farm to the fork" to prevent foodborne illnesses. The equipment requirement as discussed is only one of several parts which have been or soon to be established from the massive reform. FSMA will also hold importers to stricter standards and provide the FDA with full authority to initiate a recall. Integrating hygienic design principles as described by AMIF, NSF and the FDA (among others) will help in preventing bacteria growth which in turn will prevent illness, recalls and lawsuits.

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