

A Uniform Approach to HACCP

by Dr. Al Baroudi

“Uniforms and apparel should be an integral part of a food plant’s HACCP program.”



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PAPER OVERVIEW

The federal government has made Hazard Analysis and Critical Control Points (HACCP) the centerpiece of food-safety initiatives. The system is designed to identify, prioritize and control potential problems. Under HACCP, it is every manufacturer's prerogative to rank the severity of the physical, chemical and microbial dangers in a process. While uniforms and garments are not likely the weakest link for a business in which food safety is imperative, operators should recognize the risks of improper care, cleaning and garment handling. Partnering with a uniform supplier that can document the steps taken to minimize the hazards garments can present in a food-handling environment is a value-added proposition. While it is important to prioritize and manage the number of Critical Control Points (CCPs) in an operation's HACCP program, successful business operators utilize qualified suppliers to help them manage, monitor and record identified CCPs such as uniforms and garments.

HACCP programs represent a mindset shift on the part of operators. Operations managers must focus not on detecting problems, but on preventing them. Prevention has two key elements: (1) anticipation of the problems, and (2) design of the right, preventative solutions. Prevention is active, not passive, in its approach. Environmental hazards are targeted under HACCP, but pathogens aren't the only life form in a plant. The people working there also must be considered and addressed by plant-safety initiatives. One of the greatest variables and the hardest to manage are the employees involved in the manufacturing process. Next to their hands, the employees' uniforms and garments pose the greatest risk of product contamination. A quality uniform supplier should strengthen, not compromise, the HACCP program in a foodservice or processing environment.

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Dr. Baroudi is the President of Food Safety Institute (FSI), International, a Henderson, Nevada-based consulting company with offices in Newport Beach, California. FSI specializes in food-safety best practices and quality assurance throughout the food-supply chain. A veteran of the food industry, Dr. Baroudi has worked throughout the world, spearheading food research and developing quality-assurance programs for clients, ranging from governments to multi billion-dollar corporations. FSI works with companies such as, Yum! Brands, Safeway, Hidden Villa Ranch, Woodward Labs, Quaker, Arrowsight/ADT and many others. Dr. Baroudi's specialization has also given him the opportunity to regularly train food-safety auditors and inspectors in the U.S. Department of Agriculture; the Food and Drug Administration; and federal, state and local health agencies. He earned a Ph.D. in Food Processing and Technology from Ohio State University and a Master's in Food Science and Technology from University of California, Davis.

Dr. Baroudi's background includes working as the head of Quality Assurance (QA) and Food Safety at Borden, where he oversaw QA operations at 89 plants in Borden's dairy division. Dr. Baroudi has served as Vice President for Corporate QA, Food Safety and Environmental Affairs at Vons (a \$5.5 billion division of Safeway), as Vice President of QA and Technical Services for Harry & David Corp. and as the Chief Scientific, Health and Regulatory Affairs Officer of Yum! Brands (A \$35-billion corporation: KFC, Pizza Hut, Taco Bell, A & W and Long John Silver's).

He has appeared on several TV and radio talk shows as a food-safety expert and has served on the Blue Ribbon Task Force Committee on E. coli O157:H7. He served on the Board of Directors of the International HACCP Alliance and is a member of the Board of Advisors for the Center for Food Safety at the University of Georgia.

CASE STUDY: **ARAMARK Uniform Services**, Burbank, CA

ARAMARK offers uniforms and protective apparel, as well as personal protective equipment. Jim Holton, Sr. National Account Executive, Food Manufacturing, says that purchasers should realize uniforms represent a valuable piece in the food-safety puzzle in any operation where contamination control is imperative.

“Garment specifications such as fabric content, closure type and body and sleeve length all need to be considered to help reduce opportunities for food contamination and injuries,” he says. Companies utilizing the products and services of uniform companies need to know the garments worn by their workers utilize the most pathogen-resistant materials, while minimizing opportunities for human error.

Uniform companies should hold themselves to the same uncompromising standards their customers set for their operations. Reputable uniform suppliers will adhere to their internal HACCP program for cleaning, handling, transporting and delivering uniforms.

“A company’s uniform supplier should act as a consultant and a trusted partner in the food industry,” Holton says. “This supplier should work closely with customers to evaluate safety needs, as well as identify and implement equipment and apparel that best support individual HACCP programs.”

The basic principles of HACCP require a processing plant or food-handling business to ask the following questions about all areas of their procedures, including uniforms and garments. This paper addresses these questions:

1. Can garments pose food contamination risks?
2. Can hazards be prevented through corrective actions?
3. Can the hazards be monitored, measured and documented?

INTRODUCTION

With global food-safety awareness elevated throughout the supply chain, a proactive approach to controlling hazards is a fundamental aspect of doing business in the food industry today. This process requires vigilant documentation and constant review of processes. The importance of product safety in any food operation is paramount, but it must be acknowledged that this comes at a price, as regulatory compliance and sanitation steps ultimately impact the bottom line.

Flexibility in addressing identified hazards is inherent in effective HACCP programs, as it permits processors to select the appropriate control measures in the context of how the whole system functions, allowing processors to use the most appropriate and economical methods. No matter the Critical Control Point (CCP) at issue, all vendors should be evaluated on their ability to enhance their customers' HACCP programs.

Out of the top 10 common food-handling practices causing food poisoning, both cross-contamination and infected persons can involve employee uniforms and garments. Key preventative measures for reducing the risk of cross-contamination and infected persons are:

- Proper training of all personnel who access a facility
- Employees practicing good personal hygiene
- Effective cleaning of all areas
- Using reputable suppliers

■ PRINCIPLES OF HACCP

Most food, beverage and consumer-packaged goods manufacturers are well acquainted with the regulations known as Hazard Analysis and Critical Control Points (HACCP). The seven steps of the HACCP programs address the analysis and control of biological, chemical and physical hazards.

The most important aspect of HACCP is that it is a preventative, rather than an inspection-based, system of controlling food-safety hazards. Because preventing hazards cannot be accomplished by end-product inspection, controlling processes during production offers the most effective approach. HACCP focuses on three types of hazards: biological, chemical and physical. Biological hazards typically receive the most attention in a HACCP program because they also present the greatest risk in terms of severity and occurrence. Physical hazards include glass, metal, plastic and garment material that can get into a product during production.

HACCP is not a painless process. The preventive measures, monitoring requirements, corrective actions, verification procedures and record-keeping requirements are tedious. Many operations designate a person whose main job is to maintain the paperwork required to keep their company's HACCP program up to date and valid. HACCP plans address different products and processes, each crafted to target the pathogen posing the greatest risk. The objective of HACCP is to make the product as safe as possible and to be able to prove that the product was processed in the safest manner possible. This is a monumental task, requiring vendors to play a key role.

The Centers for Disease Control and Prevention estimates foodborne diseases cause approximately 76 million illnesses, 325,000 hospitalizations and 5,000 deaths in the United States each year. While there currently is no established USDA or FDA guideline requiring food establishments (processing plants, restaurants, retail meat, deli and bakery departments) to use laundry services, there is a universal expectation within the industry that a sanitized, safe work environment will be maintained.

For processing plants, quality control managers are responsible for the design and maintenance of HACCP programs, with government agencies auditing compliance. For restaurants, HACCP programs are usually monitored by executive chefs or general managers who are responsible for maintaining the program's integrity. In supermarkets, department managers are usually in charge of the program, if one exists.

HISTORY OF HACCP

Developed in 1959 by Pillsbury Corporation with the NASA space program, HACCP is a system of quality-control management that places responsibility in the hands of manufacturers and handlers of food products. It is a system of food control based on the prevention of food-safety problems and is accepted by international authorities as the most effective means of controlling foodborne diseases.

In 1973, the concept of HACCP was introduced to the food-processing industry—first the canning industry; then seafood, meat and poultry; and, most recently, juice manufacturers. It is projected to be mandated in other food-processing industries like dairy and baking within the next five years. It should be noted that HACCP is used in almost all food industries as a method of controlling food safety. Within the restaurant industry, for example, while it is not “government mandated,” it is a program many restaurants are voluntarily implementing as a means of food-safety control.

SEVEN PRINCIPLES OF HACCP FOR THE FOOD INDUSTRY

HACCP is a seven-step process, which must be continuously updated to ensure a company has a preventive system of hazard control in place to maintain food safety. The seven steps of the HACCP system address the analysis and control of biological, chemical and physical hazards.

- 1. Conduct Hazard Analysis.** Prepare a list of steps in the process where significant hazards could occur.
- 2. Establish Critical Control Points.** A critical control point is a point, step or procedure at which control can be applied and a food-safety hazard can be prevented, eliminated or reduced to an acceptable level. Note: For those companies identifying uniforms and garments as hazards, qualified uniform suppliers can control those hazards for the plant.
- 3. Establish Critical Limits.** These are the scientific limits that establish whether or not a process is in control.
- 4. Establish Monitoring Procedures.** These are necessary to eliminate or reduce hazards that have been established. These procedures monitor the process within the critical limits for food safety.
- 5. Establish Corrective Action.** Predetermined corrective action should take place if a process goes out of control, as indicated.
- 6. Verification.** This is the principle within HACCP that makes the system self-correcting and double-checked. A third party must be the verifier.
- 7. Record-keeping.** This is an HACCP requirement that must be kept to support most of the prerequisite programs. HACCP programs take into consideration CCPs that could severely compromise food safety.

CASE STUDY: HACCP in the Food-Service Industry

Within the food-service segment, many restaurants are voluntarily adopting HACCP programs to control and monitor food safety. McDonald's was one of the first fast-food chains to implement HACCP throughout its supply chain and in its restaurants. HACCP principles apply as food arrives at the back door of restaurants, through the preparation and cooking areas and onto the dining area. The goal is to demonstrate that every step is outlined, followed, properly documented and independently verified to ensure the system is working. This food flow includes receiving, storage, preparation, cooking, hot or cold holding, rapid cooling, reheating and serving.

In applications within the food-service segment, garments that are not cleaned and properly maintained can be a source for cross-contamination and a potential foodborne illness outbreak. While work garments and uniforms are not yet required to be included in food-service operations' HACCP programs, they must be contained in a company's Standard Sanitation Operating Procedures (SSOP) program, which is a prerequisite to a good HACCP program.

■ ■ BASICS OF FOOD SAFETY AS IT RELATES TO UNIFORMS AND GARMENTS

Adhering to strict food-safety and sanitation procedures is required to minimize the risk of customers contracting a foodborne illness. Outbreaks of foodborne illnesses have spawned lawsuits and liability claims, costing careless companies millions in settlements and millions more in reputation damage.

A clean facility is not necessarily a sanitary facility. "Clean" typically implies visible cleanliness. Sanitation addresses levels of invisible cleanliness. Foodborne illnesses can be caused by microorganisms, such as pathogens, yeast, mold, viruses and parasites that are impossible to see.

THE BASICS OF FOOD SAFETY

1. Raw and cooked foods should be kept apart.
2. Employees working in raw and cooked product areas of plants should be kept apart.
3. Employees should wash their hands and all utensils and cutting boards after handling uncooked foods.
4. Raw vegetables should be washed thoroughly.
5. Raw meat and raw fish should be cooked to an internal temperature of 160°F; raw poultry to 180°F.
6. Hot foods should be kept at a temperature above 140°F.
7. Cold prepared foods must be kept at or below 40°F.

These rules relate to handling of food items, but good personal hygiene is also essential to ensure food safety. Disease-causing bacteria may be present on the skin and in the noses of healthy people. Food handlers must maintain a high standard of personal hygiene and cleanliness to avoid transferring harmful bacteria to foods. The following points apply to employees' attire:

- Uniforms, aprons and garments should be clean at the beginning of each shift and changed regularly when necessary.
- Uniforms or aprons should not be worn outside the food-preparation area.
- Avoid using handkerchiefs for wiping or blowing noses; use disposable tissues.
- Wear disposable gloves.
- Avoid wearing jewelry while handling or preparing food.
- Do not wear damaged or deteriorating uniforms, aprons or garments.
- No pockets above the waist and no buttons on the garments.

■ ■ ■ GENERAL SOURCES OF CONTAMINATION

These are some of the most common sources of contamination in food- processing environments:

- Human hands, coughs and sneezes, hair, insects, birds, rodents
- Cross-contamination from raw to ready-to-eat food products
- Improperly cleaned and sanitized equipment, cutting boards (including slicing machines, storage trays, utensils and scales)
- Improperly cooked foods permitted to cool slowly
- Improper holding temperatures in the danger zone (40°F to 140°F)
- Dirty aprons, smocks, wiping cloths, contaminated uniforms

These hazards can result in:

- Harmful microorganisms contaminating raw materials
- Harmful microorganisms growing during processing
- Harmful microorganisms or toxins surviving a heating process
- Chemicals contaminating food
- Physical objects contaminating food

■ ■ ■ ■ RISKS OF CONTAMINATION ASSOCIATED WITH UNIFORMS AND GARMENTS

The following list highlights CCPs that can potentially lead to food-safety hazards if a uniform supplier does not address them in their own HACCP plan:

1. **Garment Material and Design.** Certain materials and designs can pose contamination risks to processors. Pockets can collect contaminants and be difficult to clean. Buttons can come loose or deteriorating garments can contaminate products.
2. **Carts/Plastic Tubs.** If the carts and tubs are not properly cleaned or lined, clean clothes can be contaminated with soiled carts or garments.
3. **Pest Control.** Without a proper pest control plan in place within the laundry-processing facility, insects and rodents can contaminate clean garments.
4. **Gloves.** Sorters and handlers can contaminate clean garments if not wearing and regularly changing disposable gloves.
5. **Cross-contamination on the Service Route.** Cross-contamination can occur when dirty clothes are picked up and placed in the same cart where clean garments are delivered. Delivery and pick up of uniforms and garments between cooked and raw product areas create opportunities for contamination.
6. **Training.** Cross-contamination can occur if uniform personnel are not properly trained on handling clean and soiled garments in the processing plant, on their delivery trucks and at the customer site.
7. **Lockers.** Lockers within a food plant that are not cleaned on a regular basis present cross-contamination risks.
8. **Service Trucks.** Trucks can contaminate clean garments if they are not kept clean and free from dirt. In addition, soiled and clean garments should be kept separate to avoid cross-contamination.
9. **Mats.** Improperly cleaned mats pose risks of contamination inside the food plant.
10. **Racks within Plants.** Materials used for racking and dirty racks pose risks of contaminating clean garments.

■ ■ ■ ■ ■ UNIFORM SUPPLIERS' ROLE IN MANAGING THESE RISKS

When looking at the role uniforms and garments play in a plant's HACCP program, customers should expect more than just clean garments. Uniform and work apparel companies must offer specialized HACCP-conscious uniform programs to companies whose success is dependent on food safety. Uniform companies should adopt a HACCP mentality as a part of their daily business, so their customers have one less control point to address. Uniform suppliers should include the following SSOPs in their HACCP program to ensure every step of their processes should guard against cross-contamination.

SSOPs CRITICAL TO PROVIDING HYGIENICALLY CLEAN GARMENTS

Wash Formulas and Temperature. It is accepted and verified by many scientific evaluations that linen and garments processed in a well-engineered wash formula are hygienically clean upon completion of the washing process. Hygienically clean is defined as "a reduction in microbial counts to a level free of bacteria, viruses and other disease-producing organisms." According to the Centers for Disease Control and Prevention, "The microbicidal action of the normal laundering process is affected by several physical and chemical factors. Although dilution is not a microbicidal mechanism, it is responsible for the removal of significant quantities of microorganisms. Soaps or detergents loosen soil and also have some microbicidal properties. Hot water provides an effective means of destroying microorganisms, and a temperature of at least 71°C (160°F) for a minimum of 25 minutes is commonly recommended for hot-water washing. Chlorine bleach provides an extra margin of safety. A total available chlorine residual of 50-150 ppm is usually achieved during the bleach cycle. The last action performed during the washing process is the addition of a mild acid to neutralize any alkalinity in the water supply, soap or detergent. The rapid shift in pH from approximately 12 to 5 also may tend to inactivate some microorganisms."

Regardless of whether hot or cold water is used for washing, the temperatures reached in drying, especially during steaming, provide an additional layer of antimicrobial protection. Once clean apparel passes through a steam tunnel, it is taken from the racks and sorted three times to ensure worn or deteriorating garments are removed from the supply chain.

The preceding process is highly effective at producing hygienically clean garments but there is still a risk of cross-contamination after the garments are washed, cleaned and processed. Such cross-contamination can occur at any point after the drying and conditioning processes within the processing plant, during transportation to distribution centers or even on the delivery trucks to final clients. This is why wrapping the clean garments in a polyurethane bag shortly after conditioning can virtually eliminate the risk of cross contamination.

Transport and Delivery. It's important to know the safeguards uniform suppliers have in place to avoid cross-contamination during transport and delivery. Some of the Critical Control Points (CCPs) are listed below:

1. Garment Material and Design

a. Garment Material. Traditional materials used for aprons, like vinyl and polyurethane, have cleanability issues. The right materials can promote both food and employee safety. A vinyl apron, for example, tends to stiffen after repeated sanitizing and exposure to cold temperatures. The plasticizers used to make vinyl what it is—a pliable material—will start to leach out. On occasion the material becomes hard and brittle, and it could start flecking into the food supply.

b. Garment Design. A line of work apparel must include various shirts, pants and smocks specifically designed for food-processing environments, all without buttons or pockets which could add potential for contaminants. In addition, color-coded garments can help managers better identify workers and visitors who could be contaminating food products by being outside their designated work areas. Research indicates 100 percent spun-polyester garments provide higher levels of anti-microbial protection as compared to cotton.

- 2. Carts/Plastic Tubs.** Carts used to transport clean clothes should either be designated for carrying clean clothes only or be equipped with a disposable plastic liner or a disposable nylon liner/cover to ensure clean clothes do not contact carts or soiled garments.
- 3. Pest Control.** Each laundry-processing plant should have an effective pest-control program in place to minimize possible hazards.
- 4. Gloves.** Disposable gloves should be worn during the sorting of dirty garments, with all sorters wearing disposable gloves that are changed regularly. Gloves should also be worn by handlers of clean food apparel before being poly-wrapped.
- 5. Cross-contamination on the Service Route.** The process for servicing food accounts must be designed and executed in a way that prevents cross-contamination. Cross-contamination can occur when dirty clothes are picked up and placed in the same cart in which clean garments are delivered. Dirty garments should be placed in a disposable plastic laundry bag within the delivery cart and should be stored in a specific location on the truck to avoid cross-contamination. The delivery person should wear disposable gloves when delivering clean garments and picking up dirty garments.

- 6. Training.** All vendor employees must be trained regularly and certified on basic food safety and preventing cross-contamination. Educational programs must include steps to avoid cross-contamination between different departments (meat, bakery, etc.) within the same plant or store on their route, as well as how to handle soiled and cleaned garments at the customer's facility and on their trucks. Your uniform vendor should also be able to inform your employees in the proper handling and storage of clean and soiled garments. Employees of apparel companies should be trained on the company's HACCP work-apparel cleaning procedures which revolve around specific processes and steps in their wash process, including standard procedures and formulas in their washing protocols to ensure maximum cleanliness. All precision-washed garments ultimately must undergo a steam-tunnel conditioning process with temperatures over 230°F to ensure bacteria elimination, as well as a set-steps quality inspection before the garments are returned to customers. The entire process must be documented, step-by-step, for compliance.
- 7. Lockers.** The lockers within the food plant should be cleaned on a regular basis to avoid contamination. Lockers must be kept in a clean designated area, away from any potential contamination.
- 8. Service Trucks.** The service trucks should be kept free of dust and dirt to avoid contamination. Soiled and cleaned garments must be physically separated on trucks to prevent cross-contamination.
- 9. Mats.** Regularly scheduled cleaning and change out of mats at doorways and within the plant must be conducted to ensure they are safe and clean.
- 10. Racks within Plants.** Storage racks must be cleaned regularly to avoid contamination. Using lightweight shelves is the recommended alternative to wood and laminated material because it is resistant to chipping and breaking while providing economical storage areas.

CASE STUDY: **ARAMARK Uniform Services**, Burbank, CA

ARAMARK's main strength is the fact that it has established standardized operational processes at all of its plants. From its science-based methods of cleaning soiled garments and uniforms to the safe delivery of product, ARAMARK understands the needs of the food industry and focuses on providing solutions to address safety, security and sanitation concerns. ARAMARK's plants apply standard formulas and identical chemistry, utilizing products provided by Ecolab to provide consistent quality out of the washer.

The marriage between ARAMARK and Ecolab® required the creation of 69 standard formulas, with specific applications tailored to the types of fabrics and kinds of soil to be removed. Ecolab is the sole provider of chemicals to all 77 production facilities ARAMARK uses in its washing/sanitizing process. Ecolab provides HACCP-friendly standard procedures and standard formulas for garment cleaning. As part of ARAMARK's HACCP plan, Ecolab conducts constant formula validation by titration for all processes. Other uniform companies might have different suppliers and various formulas for their processes, which makes validation difficult.

ARAMARK has specific formulas and procedures tailored to each type of material that focus on addressing different contaminants. The average life span of its garments is about three years, depending on client and type of industry, with a built-in process to validate fabric deterioration and to remove them from circulation before the uniforms themselves become a hazard from color migration and material deterioration. ARAMARK manufactures nearly all of its garments and uniforms at company-owned factories to assure standards are met and compliance maintained. Critical to the sanitation process is the steam tunnel that sanitizes both hangers and clean garments at temperatures over 230°F. In addition, ARAMARK provides a poly-wrap option for food customers to ensure the finished apparel remains sanitary.

ARAMARK Uniform Services is in the process of implementing its own HACCP plan in order to provide the highest sanitation standards required from its food customers. The plan requires employees to undergo training in the company's HACCP procedures and food industry requirements with the entire process documented for compliance. Food customers will be given the option to receive documented onsite ATP testing of their garments upon delivery and within the ARAMARK plant to ensure hygienically clean uniforms. The plan ensures each process is validated from the time soiled garments arrive at ARAMARK's facilities until hygienically clean apparel is delivered to the customers.

CONCLUSION

The assurance of safety comes from the process of identifying hazards, establishing controls for the identified hazards, monitoring controls and continuously verifying that the system works. Because the responsibility of HACCP falls on the individual processing plant, it leaves some feeling like they are drowning in paper. If food plants rely on trusted vendors to provide sanitary uniforms this could help alleviate a critical control point within the plant.

In summary:

- A uniform laundry program from a company with well established SSOPs is an essential component of a comprehensive HACCP program.
- In addition to good personal hygiene, proper care and laundering of uniforms is essential to food safety.
- Industry-leading uniform companies should adopt a HACCP mentality as a part of their daily business so their customers have one less control point to address.
- Uniform suppliers should have procedures in place to ensure every step of their processes guards against cross-contamination.

By selecting the right uniform supplier, employee uniforms and garments can be a simple, but effective way to increase plant hygiene and reduce cross-contamination. There are many systems that can be implemented to make it easier for workers to perform their jobs in a safe, secure and sanitary manner—and pay dividends in the long run. Companies like ARAMARK understand that uniforms can be a potential point of cross-contamination to any food processor and should be an integral part of a plant's HACCP program.