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DAIRY, FOOD AND ENVIRONMENTAL

Sanitation

A PUBLICATION OF THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION, INC.

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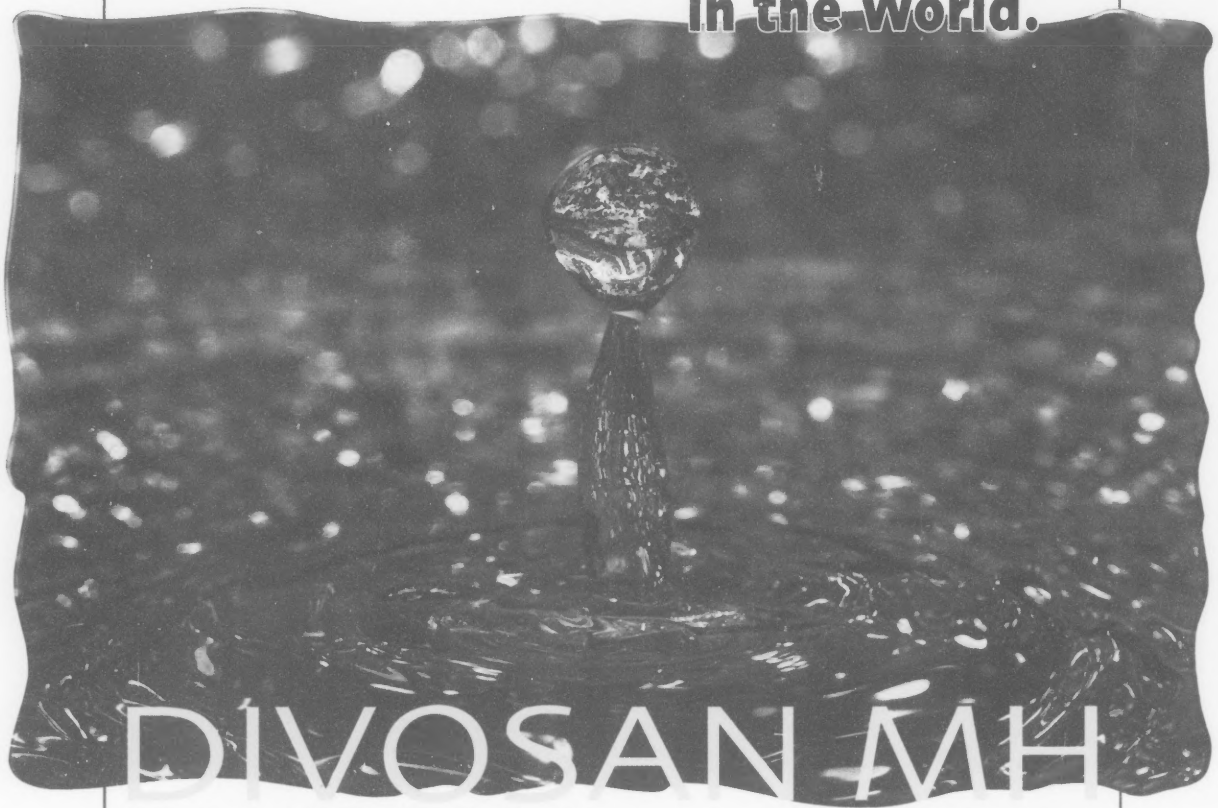

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Sanitation

International Association for Food Protection

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A Note from the *DFES* Scientific Editor... Bill LaGrange

During 2001 IAFP received 31 manuscripts to be considered for publication in *Dairy, Food and Environmental Sanitation*. After a manuscript is reviewed by two or more members of the *DFES* Editorial Board, according to prescribed requirements outlined in the *DFES* Instructions for Authors, the decision to publish in *DFES* is determined.

One goal of the *DFES* Management Committee is to have submitted manuscripts reviewed quickly, revised if necessary, and be ready for publication within four to five months. Please let Donna Bahun or me know if you are interested in serving on the *DFES* Editorial Board.

During 2001, ten manuscripts have been published, eight are being revised by the authors, eleven are still out for review, and two did not meet *DFES* standards for publication.

During 2000, 23 manuscripts were submitted for publication as compared to 30 so far this year. We encourage IAFP Members to share their professional experiences and/or research with other Members by publishing in *DFES*.

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DAIRY, FOOD AND ENVIRONMENTAL

Sanitation

A PUBLICATION OF THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

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Hilton New Orleans Riverside
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Postcards from Iowa

By JAMES DICKSON
President

"If you are looking for inspiration while the wind and snow are blowing, think San Diego in July"

Hello! I hope you enjoyed the Holidays! January is always a let down, after all of the excitement. If you live in the northern part of the country like I do, January is usually cold and dreary and it is hard to get excited about anything. I have two words for you to write down and pin up on your desk, wherever you can see them often: San Diego. If you are looking for inspiration while the wind and snow are blowing, think "San Diego in July." Our Annual Meeting in 2002 promises to be another excellent meeting, and the location can't be beat. I love to travel, and have enjoyed going to all of the annual meetings. But in January, when the temperature in Iowa can get below 0° (and that's 0°F, -18°C for the rest of you!), I'm thinking about warm weather and ocean breezes. San Diego sounds really appealing while I'm shoveling the snow off of my driveway. Mark your calendars and start making your travel plans.

As we begin the new year, I wanted to talk about a recommendation from the *Dairy, Food and Environmental* (*DFES*) Management Committee. As many of you know, our Journal Management Committees attend to the business of publishing our Journals, from the content and editorial staff to the type of paper used for printing. At the last Annual Meeting in Minneapolis, the *DFES* Management Committee recommended to the Executive Board that we change the name from "Dairy, Food and Environmental Sanitation" to "Applied Food Protection." There are many reasons for this change, but perhaps the most compelling one is to harmonize the Journal names with the name of the organization. The *DFES* Management Committee believes that this name, *Applied Food Protection*, reflects both the content of the Journal and the objectives of the organization. I personally like the proposed name for the same reasons.

Our organization has gone through a number of changes over the last several years. We began the new century with a new name, one which reflects our mission and goals. Change is difficult for some of us, and I find myself more less willing to change as time goes by. I have a degree in Dairy Manufacturing, and the proposal to take "Dairy" out of the *DFES* Journal name was challenging at first. But the members of the *DFES* Management Committee are very sincere, dedicated individuals, and I have learned over the years to listen closely when people like this speak. I do support the proposed name change, from *Dairy, Food and Environmental Sanitation* to *Applied Food Protection*, and I think it is the right thing for the organization.

Let me know what you think. Are we heading in the right direction? Or, as the saying went where I grew up, have we "turned left without signaling?" I want to know what you think of the proposed name change, and I am asking that you direct any and all comments to either myself or to our Executive Director, David Tharp. We don't have to change the name of the Journal, but it seems to be moving us in the right direction.

I look forward to your comments.

Same time, next month.

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Visit our Web site at www.foodprotection.org

COMMENTARY

From the Executive Director

By DAVID W. THARP, CAE
Executive Director

"We live in the most modern of times"

How fortunate we are. Just take time to look around you and consider how fortunate we are. We have rewarding employment, a place to call home, transportation to move us from place to place; we have family, friends and coworkers to support us. We live in the most modern of times.

Think of the changes that have taken place in the world in your own lifetime, the lifetime of your parents, your grandparents. It is now commonplace to travel coast to coast in the USA in a matter of hours. It is quite common to travel to countries around the globe for business meetings and conferences of interest. Technology now allows us to communicate instantly around the world in a matter of seconds. One hundred years ago, we would have to rely upon mail service (by ship) or at best telegraph service. Telegraph response would take days and mail response may take months! My how things have changed and advanced.

Do you remember a short 15 or 20 years ago when the fax machine was new technology? Manufacturers boasted that you could send documents around the world in just minutes! Now it seems that E-mail has been here forever, but from my memory, E-mail has been widely used for only four or five years. Web sites are also in their infancy when compared to other technology advancements.

So you might ask, where are you going with this topic? Well, here it is; with all of our advances in communicating around the world and the ability to travel quickly around the globe, how can IAFP increase its International Membership and involvement? We have done well with Canadian Members and even made advances with our neighbors in Mexico, but once you look outside of North America, the opportunity for growth is endless.

IAFP is looking for input and help from our International Members. We need referrals of your colleagues who we then can contact to invite their membership. Also, we welcome our International Members to send us a short note letting us know why you are an IAFP Member. Over the past few years, we have taken steps to conduct business with a more international approach. Our goal is that all food safety people from around the world should feel welcome to call IAFP home. Our Journals are internationally recognized as leaders in their field and the Annual Meeting attracts increasing number of international attendees each year.

Our growth in Mexico can be attributed to the Mexican Affiliate chartered in 1999. Also, it should be mentioned that in 1997, a group from Korea established an Affiliate organization and we have seen nice growth in Members from Korea. Groups or individuals in Brazil and England are working with IAFP and we hope to initiate Affiliates soon in these countries. It only takes five IAFP Members to begin an Affiliate. If you are interested in starting an Affiliate, contact the IAFP office.

I want to take this opportunity to encourage our traveling IAFP Members to do their part in promoting the Association to your business associates and colleagues. This applies for Members travelling internationally and domestically as well! We are able to provide you with brochures if that would help make your discussion of IAFP easier. Simply contact our office and we will send you a supply of brochures.

What do we have planned for the future to attract International Members? First off, we are working feverishly to place the *Journal of Food Protection* online to assist all Members in obtaining the research articles from *JFP* faster and at an economical cost. This will increase the accessibility to *JFP* articles for all Members, but specifically International Members. In the future, we want to hold a two or three-day IAFP symposium somewhere outside of North America. It is our hope to do this on a two-year cycle. Both of these efforts are designed with our International Members in mind.

To summarize for this month, with the technology we have at our hands today, we want to be able to serve our International Member's needs. We also want to attract new International Members who can assist IAFP in *Advancing Food Safety Worldwide!* Won't you please support our efforts?

Dairy, Food and Environmental Sanitation, Vol. 22, No. 1, Pages 14-17

Telecommuting for Environmental Health Specialists

Planning, Implementing and Managing a Program: The Plano, Texas Experience

Steve Berry* and Tomeji Miller
City of Plano Health Department, P.O. Box 860358
Plano, Texas 75086-0358

SUMMARY

Telecommuting is an alternative way of accomplishing work tasks that at the same time provides a variety of benefits to organizations, workers, communities and the environment. The City of Plano Health Department implemented a pilot project to evaluate the pros and cons of a telecommuting program. The results of the pilot project indicated that implementing such a program requires proper planning, training and good communication for telecommuting to be successful.

Managing the telecommuting program and supervising the employees are other key components of the success or failure of the program. Managers must embrace the idea of telecommuting positively and continue to encourage employees. Working to maintain high employee morale is also important. Employees must buy into the idea and believe that the program will work. Supervisors must evaluate both quantity and quality of work and have open communication with employees and support staff.

Telecommuting can result in higher quality work at lower cost. It also empowers employees to work independently and have more flexible work schedules. If managed properly, telecommuting can offer benefits to both employees and the employer.

A peer-reviewed article.

*Author for correspondence: Phone: 972.941.7349; Fax: 972.941.7142

INTRODUCTION

Environmental Health Inspector Tom Vyles of the City of Plano, Texas began his workday pretty much like everybody else: He accessed his E-mail, tapped into his voice mail, and then laid out his work schedule for the day. He returned three phone calls, conducted a conference call with his work team, updated his database, scheduled three inspections, and through his Administrative Assistant, arranged to attend a conference. Pretty much a typical morning in the workplace.

But for Tom, his primary workplace was an office in his converted spare bedroom, and his office companions were a bowl of cereal, the morning newspaper, an Internet connection, a laptop computer, and the family dog.

Welcome to the world of the telecommuter!

Whatever you choose to call it, "telework" or "telecommuting," the concept is the same: For their daily commute into the workplace, telecommuters substitute working from home for part of the workweek, usually communicating with their offices via computers, fax machines, and telephones.

The eight-to-five five-day workweek "at the office" is fast becoming a thing of the past as increasing numbers of organizations find that telecommuting offers positive organizational rewards by using today's technology to increase customer service levels, raise employee productivity and morale, maximize office space, and recruit and retain those high-quality employees who may require job flexibility. According to an October 2000 survey sponsored by the International Telecommuting Association and Council, approximately 23.6 million persons in the United States were working in some capacity, as telecommuters compared to 19.6 million a year earlier.

Although the City of Plano, Texas, is already realizing the benefits of a fledgling telecommuting program, it was not organizational benefits that prompted creation of the City's program. Dancing on the fringe of the Dallas-Fort Worth "Metroplex," Plano is included in the area's "Serious Non-Attainment Area" category for air quality. As the Metroplex continues to grow, so does traffic congestions with air quality continuing to deteriorate because of dramatic increases in the commuting population. As the largest city in Collin County, Plano (population 236,539) felt an obligation to take a leadership role setting a positive example in meeting the EPA's stringent requirements for area air quality attainment status.

Already a Metroplex leader in the use of alternative fuels and low emission vehicles within its City fleet, Plano saw the concept of telecommuting as a "natural" to initiate. Although most organizations initially view telecommuting as a method to improve workflow and customer service, the City of Plano initially viewed it as a positive way to impact air quality through reduction of vehicular travel. As an example, a one-hour round trip daily, five days per week, is equal to more than six 40-hour weeks per year on the road. Plano's City Manager challenged each department to explore the possibility of allowing employees, where feasible, to telecommute, thereby reducing emissions, conserving energy resources, and saving employee travel on an ongoing basis. Plano's Environmental Health Department, who championed the cause, took immediate action.

Following the success of an initial eight-week pilot project with four staff, a five-month pilot program utilizing seven staff members was conducted from August through December 2000, based on a three-days-per-week telecommuting program.

The results were impressive. The pilot team saved 224 round trips from home to work and back home, reducing their mileage by 3,136 miles, and thereby saving 209 gallons of gasoline and reducing airborne emissions by 3,794 pounds. Much-needed parking spaces were freed up at Plano's Municipal Center, and traffic congestion around the busy parking area received a checkmark under the "relief" column.

Additional bonuses included increased work productivity and more self-initiated work projects by the pilot team, along with increased morale due to the flexibility they had in arranging their day to meet their objectives.

The department is definitely pleased with the benefits being realized from the telecommuting program, which is now a full-time part of its operations. Telecommuting is not, however, appropriate for all jobs or for all persons. Work activities must be location independent, participants must be motivated and able to work effectively in alternative work areas, and support from upper management, with employee buy-in, is paramount.

As the City of Plano discovered, establishing a viable telecommuting program required more than initially met the eye. While the mission of the program was to assist in reduction of air pollution, and traffic congestion and to conserve resources, the program itself had to be tailored to meet the needs of the telecommuters, the office support staff, and the clientele served by the telecommuters, all within a seamless and unified environment.

Demonstrating its environmental commitment, the City chose to bear the cost of program start-up, including purchase of laptop computers, software, Internet connections, and cellular communications. The City Legal Department, developed policies and procedures on worker's compensation issues, liability for property damage, safety and security of the home office environment, home office client visitation, at-home child care during working hours, and employee eligibility and responsibility.

A Telecommuting Agreement between the City and participants was developed to identify the off-site office or work location, and city property and inventory, as well as to establish guidelines and perfor-

mance expectations. To foster ownership, an Environmental Health Telecommuting Committee with members representing all levels of departmental staffing was formed to identify areas indigenous to its operations, define areas of concern, and create appropriate solutions. How often to telecommute, when to be in the office, managagement of daily scheduling and communications, office vs. field responsibilities, and employee accountability were major areas identified as critical for maintenance of a consistent work flow between the telecommuter, the office support team, and the public.

Eight Environmental Health Specialists currently telecommute three days per week, with Wednesday as a mandatory office day and a second weekly office day selected by each telecommuter. A schedule board is maintained in the office for each telecommuter, based on weekly schedules submitted in advance by the telecommuting team; vacation days, sick days, and training days are also reflected on the schedule board. The use of laptop computers, pagers and cellular phones keep the telecommuter, office support staff and the public connected. Both e-mail communications and network data access from the home office base are made possible via internet connections.

Nextel phones, both cellular and DirectConnect, make voice mail connections, group talk and text messaging possible. A message board maintained in the office enables support staff to contact the specialists at any time via phone or pager, as needed. Telecommuters are responsible for immediate response to staff paging and prompt return of all telephone calls. Submission of weekly schedules, weekly updating of shared databases, reporting changes in schedules, and submission of thorough monthly reports is critical to maintain in-house accountability. Support staff has the responsibility of maintaining message boards, and in-house schedules updating them when needed. Changes in scheduling must be reflected immediately. The support team must use its usual discretion in handling unusual complaints, determining if a field team member or in-house supervisor should be consulted for the most prompt reconciliation.

There is little doubt that the telecommuting program is a success. Telecommuters are realizing significant savings in miles driven, gasoline use, and vehicle emissions. Managers and support staff are finding the office atmosphere to be less hectic, and noise levels have been reduced. Productivity and morale have increased both in the office and in the field.

Telecommuter Tom Vyes finds the program to be a rewarding one. "The only thing I really don't care for is not being able to see my coworkers as often as I'd like. It was hard at first not to feel that I was no longer part of the team. We compensate now by getting together more for lunch, and Wednesday we are all in the office. Conference calling also helps us to work on projects as a team if we are on a telecommute day."

The majority of telecommuters shared the same sentiments. It took an average adjustment period of a month to get used to working from home and being at home. There were some feelings of guilt associated with being able to stay at home in the mornings, with having time to catch up on reading journals while sitting in a lounge chair, and with not being involved in the rush hour traffic faced by colleagues in the office. Plano's Environmental Health Director Brian Collins finds the telecommuters to be positive in their experience: "They have expressed feelings of trust, empowerment and less stress at the end of the project. Each member found it was easier to schedule inspections and felt more focused working at home without interruptions. We feel the overall productivity of our department has shown an increase."

"We have always pursued aggressive work standards and have a highly motivated team," Collins continued. "While the actual amount of measurable work may not have increased through our telecommuting program, the ability to handle multiple projects, the timeliness of our response, setting priorities and meeting deadlines we deem to all be positive signs of a productivity increase. This holds true for our in-house staff as well, who are also supportive of the program."

"I would encourage any municipality to seriously look into the development of a telecommuting program," said Collins. "For the environmental health industry, it seems the perfect marriage between increasing client service response time as well as generating a positive environmental result. The real key is having management support and allowing all levels of the employee team to be part of the developmental process. It works for Plano – it can work for you."

Communications proved to be the one area needing the most refinement once the program began. Clarification on procedures, handling of complaints, and determining the level of response required of the telecommuters was needed. Maintaining and updating the office schedule board also needed refinement to ensure efficient field communications. Management must clearly define their expectations and may need to develop a new style, managing by results rather than by observation. Employees are not micro-managed, and the focus of management must be on quality, quantity, and timeliness of work – not on the work process. Success depends on trust and professionalism, managing less, and leading more, with everyone staying involved in the process. Monthly reports are used for measuring tools. A good telecommuting program is a selling tool when an organization is trying to attract and retain top-quality workers who need more flexibility.

"Productivity increase" is a woefully poor term. Productivity includes quantity of work produced, but it also includes quality, timeliness, and ability to handle multiple projects and priorities. A well-run telecommuting program should, at worst, break even. Telecommuters should be able to do the same amount of work as they did in the office, if not more, and they should be doing better work, meeting deadlines better, and being able to juggle multiple priorities and deadlines; effectiveness, productivity, call it what you will. However, Plano found that employees tend to continue their same work ethics while telecommuting; telecommuting alone does not improve work performance. Employee work performance must be addressed at the beginning of the program, before the flexible schedule can be abused. Most teams have some work that is collaborative in nature, but as least as much that is individual work. The key to using telecommuting in a team environment is to organize the work so that most of the individual work is reserved for telecommuting days, with collaboration taking place when everyone is in the office. Telecommuting helps decide what should be done by a team and what can be done by an individual.

There is no right number of days to telecommute. It seems to work best when the range is from one to three days per week, on average. Full-time telecommuters find it harder to continue feeling part of a work group and find it more difficult to schedule meetings that must be attended.

Telecommuting takes cars off the road and reduces air pollution, but that's not the main reason for employers to use it. Rather it makes good business sense and will help remove cars from clogged highways.

Other key components of a telecommuting program include:

- Visibility of senior management support
- Willingness to commit a suitable budget
- Open-mindedness and acceptance by managers
- Suitability of technology

Telecommuting isn't appropriate for every job. Some activities don't lend themselves to it, and organizations need to analyze the job activity, not the job title, to determine suitability. Also, because telecommuting isn't for everyone, it's equally important to limit telecommuting to employees who have the job knowledge/skills, personality, self-motivation, and home setting that will allow them to work effectively at home or elsewhere away from the office. It's incorrect to assume that everyone is cut out for doing office work away from the office; careful and equitable selection processes are the key.

How the telecommuting program is planned, managed, and supported determines its success. The key is rooted in a scalable formal employer-sponsored program rather than informal uses of remote work technologies. Telecommuters in well-managed programs have a chance to act more independently, make more decisions, solve more problems, do better planning and otherwise demonstrate the kinds of skills and traits sought when looking for promotable employees.

Also to be addressed are the participant's home office and client home visitation. The home office, which must be a secure and safe work environment, is subject to a supervisor's inspection. Home office visitation on work-related matters is not allowed without prior supervisor approval, nor is childcare permitted during work hours.

Participants must be approved by their supervisor and department head, and employees neither have the right to telecommute nor can be forced to telecommute.

A telecommuting program offers many benefits and savings when carefully planned and implemented. Food inspection programs and other environmental inspection programs lend themselves to telecommuting because of daily field inspection responsibilities of staff. Managers and supervisors are encouraged to explore the feasibility of a telecommuting program within their departments. It is a great tool for increasing productivity and employee morale in addition to the significant reductions in commute time, gasoline used, and air pollution generated.

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Exploring New Mathematical Approaches to Microbiological Food Safety Evaluation: An Approach to More Efficient Risk Assessment Implementation

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SUMMARY

Inactivation of foodborne microorganisms by novel technologies is an important alternative in the development of new, high-quality food products. The survival curves obtained with many of these novel techniques, such as addition of natural antimicrobials or use of high intensity-pulsed electric fields, show deviations from first-order kinetics. When the survival curve is not linear and the processing time falls within the final, nonlinear section of the curve, use of a linear relationship is not advisable. This constitutes a problem in establishing safe processing conditions. The Weibull distribution is one of the distribution functions used to describe the behavior of systems or events having some degree of variability. The present work describes how the Weibull distribution function can be applied to survival curves that show upward concavity, also known as tailing and how it can be used to calculate precisely the processing time required to achieve a certain reduction in a bacterial population. This would allow for efficient application of novel technologies in establishing the level of safety achieved, resulting in accurate risk assessment.

A peer-reviewed article.

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Figure 1. Survivol curve for *Bocillus cereus* vegetative cells exposed to 0.15 µg ml^{-1} nisin at pH 5.75 and 30°C, with experimental points fit by equation 1.

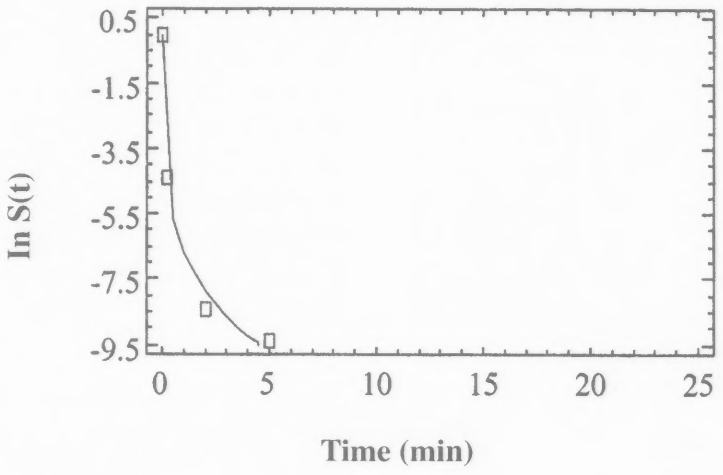
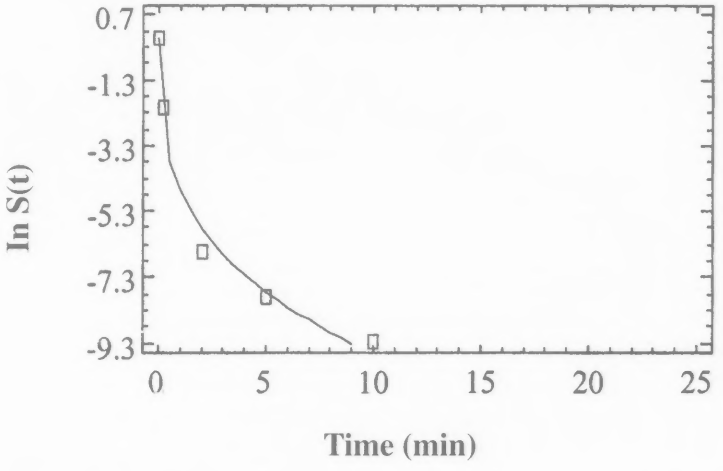


Figure 2. Survivol curve for *Bocillus cereus* vegetative cells exposed to 0.15 µg ml^{-1} nisin at pH 5.75 and 8°C, with experimental points fit by equation 1.



INTRODUCTION

The development of minimally processed foods with natural characteristics and high nutritional and organoleptic qualities has increased continuously in America and Europe over the past few years.

Heat has been the most widely used method for food preservation. Moderate heat can be of interest for foods that need a cooking process *(8)*, but heat treatments also cause food quality losses that may be important from the consumer's point of view. These negative aspects of heat preservation have led to the search for, and development of, new food preservation technologies, among which ultra high pressure (UHP) and high intensity pulsed electric fields (HIPEF) have proved to be of most interest to scientists and food processors *(4, 17)*.

Control of pathogenic bacteria can be achieved by addition of chemicals, reducing the risk of food poisoning outbreaks. These methods may have effects that are counter to food industry's and consumers' demands for additive free, fresher and more natural food products *(9)* along with microbiological safety. Such demands could be met by the use of natural antimicrobial systems for preservation of foods. Bacteriocins, produced by lactic acid bacteria, are an example of natural preservatives, as are other substances (such as essential oil components from aromatic plants). Such preservatives represent an interesting source of natural antimicrobials for food preservation due to their antibacterial, antifungal or antioxidative activity *(3)*. Nisin is a bacteriocin that has found practical application as a natural food preservative *(6)*. Its effectiveness depends on growth and exposure conditions, such as temperature *(1)* and pH *(14)*.

Minimal processes are not able to completely inactivate all the pathogenic and spoilage microorganisms present in a product, which can limit the product's shelf life or even its commercialization *(16)*. In fact, companies have identified among their main research priorities healthful, natural foods and food safety *(11)*.

When UHP, HIPEF or natural antimicrobials were first studied, first-order kinetics were applied to describe microbial inactivation by these processes *(10)*. When these treatments are applied so as to achieve several log reductions (3-4 log cycles) in microbial counts, tails start to appear consistently *(5, 14, 15)*. Therefore, the effect of the different processes on the microorganisms present in these types of foods is critical, and application of concepts such as D and z values, currently used with shelf-stable products, can lead to great disagreement in interpretation of experimental evidence. In many cases such as those just described, data indicate higher-than-predicted survival rates after a particular treatment, with limited process applications. This lack of appropriate tools to model these data has been commented upon recently *(10)*.

Figure 3. Survivol curve for *Bocillus cereus* vegetotive cells exposed to 0.15 µg ml^{-1} nisin at pH 6.3 and 8°C, with experimental points fit by equation 1.

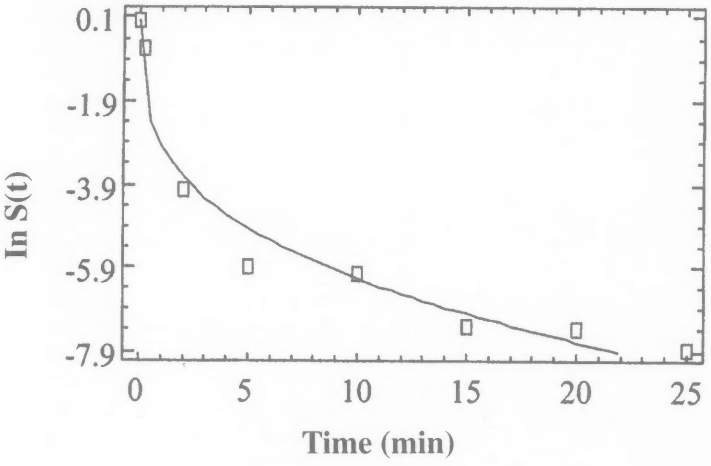
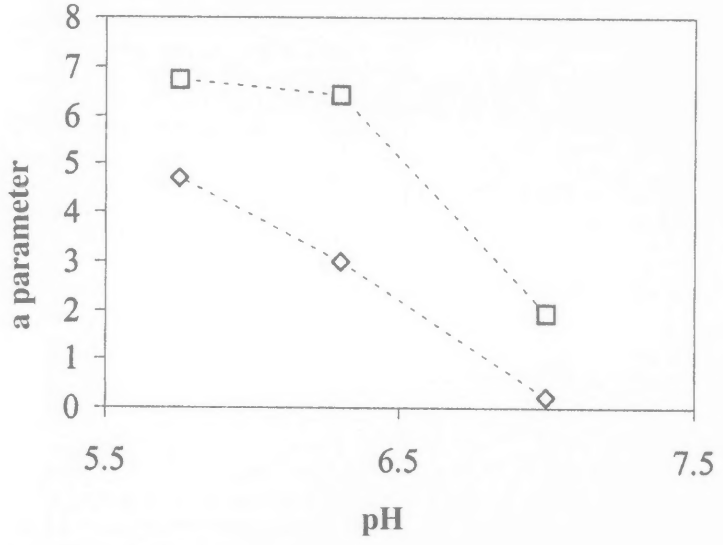


Figure 4. Comparison of o porometers derived from the Weibull equotion, obtoined with different pH values and at 8°C (◊) or 30°C (□).



When the survival curve does not follow a linear relationship and the processing time falls within the final, nonlinear section of the curve, use of a linear relationship is not advisable. If we consider the survival curve to be a cumulative form of temporary distribution of lethality events *(12, 13)*, this curve would reflect the distribution of resistances to the processing conditions, in which case the inactivation of microorganisms could be described by a distribution function. The Weibull distribution, one of the distribution functions used to describe the behavior of systems or events having some degree of variability, considers microorganisms as individuals and can describe the effect of processes that deviate from linearity *(7)*.

The present work describes how the Weibull distribution function can be used as an effective tool in evaluating inactivation/survival of microorganisms exposed to natural antimicrobials and novel technologies when the survival curves have upward concavity (traditional tails). The results obtained with this model allow realistic evaluation of the inactivation obtained and therefore of the level of safety achieved, critical factors in the viability and shelf life of products subjected to mild processes. Efficient microbiological risk assessment, necessary for development of such new food products, would thus be made possible.

MATERIALS AND METHODS

Analysis of survivors

If the inactivation of microorganisms by any preservation system follows a Weibull distribution, the survival function will be:

$$S_{(t)} = e^{-a*(t)^n} \quad \text{equation 1}$$

where $S_{(t)}$ is the fraction of survivors achieved by the process, t is time, a is the scale (which could be considered a kinetic rate parameter), and n is a variable that describes the shape of the curve. Values of n lower than 1 indicate the presence of tailing, whereas n values close to 1 indicate a linear inactivation pattern.

Predictions for time to a specific microbial decrease population can be derived from equation 1; the function would be

$$t = \ln (S_{(t)}/-a)^{1/n} \quad \text{Equation 2}$$

Experimental data

The different sets of data were obtained from the scientific literature and were chosen according to the following criteria: (a) survival curves representative of the technologies applied, (b) availability of data to model them, and (c) results obtained with different microorganisms, to allow more general conclusions to be drawn. Survival curves obtained with HIPEF *(2)* and nisin *(14)* under different conditions were analyzed. The interpretation of the parameters obtained and

Figure 5. Survival curve for *Solmonello senftenberg* exposed to o high intensity, pulsed electric field, field strength 22 kV/cm, with experimental points fit by equation 1.

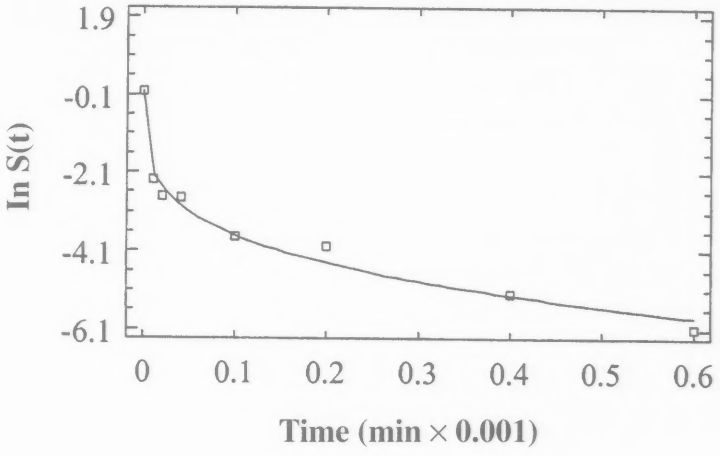
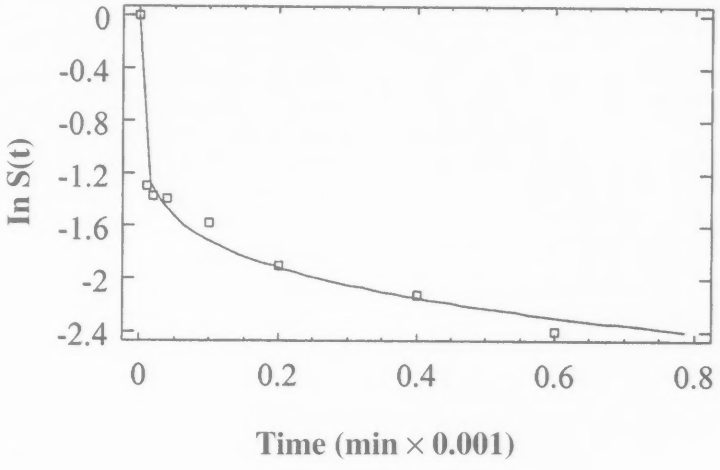


Figure 6. Survivol curve far *Salmanella senftenberg* exposed to o high intensity, pulsed electric field, field strength 18 kV/cm, with experimentol points fit by equotion 1.



goodness of fit using the Weibull function are evaluated (table 1).

RESULTS AND DISCUSSION

Survival curves obtained with different technologies (HIPEF and nisin) on semilogarithmic coordinates are shown (Figs. 1-3, 5-6). All showed clear tailing after an initial linear phase of variable extent (between 1 and 6 log reductions). This indicates that the traditional linear regressions used to model survival curves (Bigelow equation) are inadequate for interpreting these sets of data, as indicated by their low correlation coefficients, lower than 0.90 in all cases (table 2). Interpretation of such data would therefore be limited and difficult to extrapolate to real processing conditions with traditional methods (D and z values). For example, HIPEF data in the scientific literature have been analyzed using two points from the survival curve (the initial population and the final population), which implies many limitations (e.g. fitting using Bigelow, table 2) *(10)*. However, these experimental results consistently show a curved trend, indicating their validity and the need for new modelling alternatives.

Application of Equation 1 (survival function derived from the Weibull distribution) to the experimental data produced a much better fit. The shape parameter (n), lower than one in all cases (tables 1 and 2), indicated that exposure to these agents induces tailing in a population of vegetative cells. In fact, the Weibull distribution treats exponential distribution as a particular case (n = 1) when data are best fitted by an equation of first-order kinetics, which was not the case for any of the sets of data modeled in the present study.

For the data obtained with natural antimicrobials (nisin), the tailing was less evident under less stressful conditions. *B. cereus* vegetative cells exposed to nisin at 8°C, at pH 7, showed almost linear kinetics, evidenced by a relatively high n value (0.7). On the other hand, under more stressful conditions (high temperature, low pH), the tailing was obvious, as was indicated by a low n value (table 1).

The scale parameter, a indicates how quickly microorganisms are inactivated under certain conditions. The more stressful the conditions, the higher the 'a' values. In the results obtained with nisin, for all pH values tested, *B. cereus* cells were more sensitive to nisin at the highest temperature (30°C) than at 8°C, and hence the a values were higher at 30°C than at 8°C; for example, at pH 7, a = 1.93 at 30°C and a = 0.21 at 8°C (table 1). When the a parameter was plotted versus pH, nisin also evidenced a different behavior depending on temperature (Fig. 4). At 30°C, the a values at pH 6.3 and 5.75 were very close and both were higher than the one obtained at pH 7. At 8°C, however, the effect of pH was almost linear (Fig.

TABLE 1. Parameters of Weibull distribution estimated from survival curves of *Bacillus cereus* vegetative cells, exposed to nisin (µol/ml) at pH and temperatures indicated

pH	Temperature	*a* parameter	*n* parameter	Time (min) to 5-log decrease
7	30°C	1.93	0.54	11.0
7	8°C	0.21	0.70	78.3
6.3	30°C	6.41	0.35	5.1
6.3	8°C	2.99	0.31	12.4
5.75	30°C	6.71	0.23	7.4
5.75	8°C	4.69	0.31	7.9

TABLE 2. Parameters of Weibull distribution estimated from survival curves of *Salmonella senftenberg*, by pulsed electric fields at different electric field intensities

Inoculum level (CFU/ml)	Electric field strength	Fitting using Bigelow (R^2)	*a* parameter	*n* parameter
$3*10^7$	18 kV/cm	58.9%	2.5	0.16
$3*10^7$	20 kV/cm	81.8%	4.5	0.30
$3*10^7$	22 kV/cm	75.7%	6.6	0.25

4). This indicated that the combined effect of nisin and pH shows different sensitivity to pH changes, depending on the temperature of exposure.

Salmonella senftenberg cells exposed to HIPEF treatment showed pronounced tailing in all cases. The more evident tail was obtained for cells exposed to the lowest electric field strength (18 kV/cm), which corresponds to the lowest *n* value found (figures 5 and 6, table 2). The highest *a* parameter corresponded to the higher electric field applied, indicating more rapid inactivation.

Our results show that all the survival curves were correctly described by the two parameters generated, which indicated the presence and extent of the tails (*n* parameter) and the effectiveness of the processing conditions (*a* parameter). Similar survival curves that have been obtained with microorganism inactivation by UHP, desinfectants, etc. could also be fitted efficiently by this distribution. Although such novel technologies harm food quality less than heat does, all of them share in common, the characteristic that, even under extremely stressful conditions, a low (or moderate) fraction of resistant microorganisms may still be able to grow. From a practical point of view, the Weibull distribution can help in predicting the survival or inactivation associated with these factors, thereby helping to guarantee the safety of food products. It can also help to establish the most appropriate intensity or concentration of the inactivation agent to achieve a certain degree of microbial inactivation (because further processing may not significantly decrease microbial counts).

In general, a 5-log reduction in foodborne microorganisms is required for minimally processed foods (including acidic products), and it is necessary to verify whether a process or a combination of processes have succeeded in achieving this target *(8)*. The parameters derived by Weibull would allow an accurate estimation of the time needed to achieve this inactivation, which in the case of nonlinear survival curves, such as those described in this paper, would be more useful than a D value. Examples of predicted times to a 5-log reduction, obtained from equation 2, are shown (table 1). Predictions are very close to real data, as can be checked from Figures 1 to 3.

Regarding inactivation of salmonellae by HIPEF, a five-log inactivation would be achieved only after a minimum HIPEF treatment at 20 Kv/cm of 400 µs, applied under a pulse width and frequency appropriate to avoid heating of the sample *(15)*.

CONCLUSIONS

The parameters generated by the Weibull distribution can be a useful tool for comparing microbial inactivation data and for generating realistic predictions of survival fractions on the basis of experimental data. The use of consistent parameters for preservation technologies should improve the efficiency of future investigations and encourage uniformity in the methodologies for establishing minimum process requirements *(10)*. This will help facilitate the implementation of novel technologies for food processing and will allow for an effective risk assessment in the future.

ACKNOWLEDGMENTS

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IAFP 2001 Session Summaries

At the request of the *Dairy, Food and Environmental* Management Committee, Members of the Student Professional Development Group were invited to prepare summaries of sessions they attended at IAFP 2001. Following are the write-ups the students prepared.

SII: Indicator Micro-organisms — What Do They Indicate and Is It of Any Use?

Ginny Moore
University of Wales Institute-Cardiff,
Cardiff, United Kingdom

As the title suggests, this symposium focused on indicator organisms and how they may be used within the food industry as a means to reduce risk and improve safety. The practical applications of indicator organisms in poultry processing were addressed, along with the rationale behind the testing for indicator organisms within the food industry in general. Both talks gave examples of various microbial indicators and their uses including, staphylococci and enterococci as indicators of potential human or fecal contamination and Enterobacteriaceae and coliforms as indicators of post-heat process contamination. Although *E. coli* was identified as being the best indicator of possible pathogen presence, its use was also described as not being perfect and this point was illustrated using data collected, which showed an apparent lack of correlation between the incidence of *E. coli* and that of *Salmonella* or *Campylobacter*. However, concluded stated that although indicator organisms, such as *E. coli*, cannot be used to predict the presence of pathogens, such an indirect approach for assessing possible pathogen presence, can be useful in the assessment of GMPs. The use of indicator organisms, therefore, can lead to improved sanitation, process control and shelf life. Additionally, providing the microbial indicator fulfills certain criteria (i.e. is consistent, has a relationship to human health and is practical), the FDA does approve the use of indicator organisms within the context of the food. Coliforms can be used as a product integrity indicator when testing pasteurized milk for example, or when the product is associated with an at-risk consumer population (e.g. infant formula). Also discussed during this symposium was the role indicator organisms play within a standardized microbiological monitoring program jointly developed by the New Zealand Meat Industry Standards Council and the Ministry of Agriculture and Forestry (MAF) Regulatory Authority and the statistical relationship between microbial and non-microbial indicators of fecal contamination. The symposium was concluded by observing that however useful the sampling of indicator organisms, the results have no value unless decision making is affected.

S16: Communicating Science Effectively

Kali Kniel
Virginia Tech, Blacksburg, Virginia

The essential skills involved in communicating science effectively were addressed in this symposium. Communicating science effectively requires many factors that must be considered in order to reach the final goal. These factors include listening first and then generating trust, followed by acknowledging and understanding the concerns of the audience. These steps will allow individuals to participate in an informed decision making process. When addressing the public on scientific matters, it is important to remember that you are not alone, and that benefits can come from partners who share your goals. For example, trade associations, like NFPA, represent the food industry, and therefore have a vested interest in educating journalists, lobbyists, and consumers alike. When communicating with any audience it is important to be patient and to take the time to explain concepts carefully so that everyone understands while at the same time not alienating any potential contacts, i.e. media or press agents. Additionally, it is necessary to address both the positive and negative issues, while making these points informative and interesting. It is also important to be project specific, and provide relevant consumer information. This often requires advanced planning and organizational steps to complete the project successfully. These points hold true when trying to obtain funding or other means of support. Information on impact, relevance, accomplishments, and skills should be offered as well. Have a communication goal in mind that includes key messages that should address the main audience. Overall, these general rules apply to all areas of science whether one is discussing irradiation of ground beef or the genetically-modified potatoes.

Late-Breaking Session: Fresh Cantaloupe Research: What We Know and What We Still Need to Know

Manan Sharma
University of Georgia, Griffin, Georgia

The late-breaking cantaloupe session at the IAFP 2001 meeting was organnized in response to the recent *Salmonella* outbreak this past spring that affected persons in southern California. Speakers addressed a variety of issues that included background on geographical regions where cantaloupes are grown, the seasons, and field conditions under which they are harvested. Other topic included worker hygiene and transport conditions of the fruit. Scientific data was presented showed the survival of *Salmonella* and other bacteria on the surface of cantaloupes. Data was also presented on the differences that researchers use in reporting populations of bacteria in produce commodities, and whether or not standardized reporting techniques would be useful. Others raised the issue that if a sanitizing treatment or intervention was applied to cantaloupes, would they still be able to be marketed as a fresh commodity. Concerns were raised that even though the outbreak was limited to one facility, all cantaloupe producers felt the economic impact. Some suggested that standardized operating procedures be set either by the industry or a governmental agency so all cantaloupe growers could implement them. Overall, this session provided valuable information on a current food safety issue for the IAFP Membership.

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$2,000	Exhibitor Move-in Refreshments (Sunday)
$1,800	Awards Banquet Flowers (Wednesday)
$1,750	Committee Day Refreshments (Sunday)
$1,000	Speaker Travel Support
$600	Golfers' Continental Breakfast (Sunday)
$Various	Golf Tournament Prizes (Sunday)

Partial sponsorship for the above events is available.
Contact Dave Larson for details.

SPONSORSHIP PARTICIPANT

Name _____

Company _____

Address _____

City _____ State or Province _____

Country _____ Postal Code/Zip + 4 _____

Phone _____ Fax _____

E-mail _____

Desired Event to Sponsor _____

Amount Paid _____

Payment: ❑ Check ❑ Mastercard ❑ VISA ❑ American Express

Account Number _____

Expiration Date _____

Cardholder Signature _____

Contact:

Dave Larson
Phone: 515.440.2810
Fax: 515.440.2809
E-mail: larson6@earthlink.net

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★ US Funds on US Bank ★

Highlights of the Executive Board Meeting
November 2, 2001
Teleconference

Following is an unofficial summary of actions from the Executive Board Meeting held November 2, 2001 via teleconference:

Approved the following:

- Minutes of August 3-9, 2001 Executive Board Meeting
- Revised mission statements for the Applied Laboratory Methods PDG, Microbial Risk PDG and the Outreach Education PDG

Discussed the following:

- Discussed improving *DFES* manuscript status — still need to encourage submissions. *JFP* page count increased to publish articles timely. Web site improvements continue
- Membership Update: Membership continues steady. Need to increase efforts internationally
- Advertising/Exhibits Update: Ad sales outpace last year's results. Exhibit Hall for IAFP 2002 35% sold
- Financial Update: Fiscal year ending August 31, 2001 audit report presented. Net results for the year exceeded budgeted expectations
- Staff retirement plan contribution
- Review of Affiliate Council's recommendations to the Executive Board
- Fall Affiliate Newsletter mailed in October
- Continuation of Affiliate educational reception
- IAFP Officers made presentations to seven Affiliate organizations this fall. Three are scheduled for winter meetings
- NYSAMFS changes name to New York State Association for Food Protection
- Possible Southern California Affiliate
- Financial results for IAFP 2001
- Survey results from IAFP 2001
- Planning for IAFP 2002 — program, Ivan Parkin Lecturer, tours and social events
- ILSI Food Security Workshop — December 12-13, 2001
- Postponed IAFP Foundation Fund Corporate Challenge to January 2002
- World Association of Veterinary Food Hygienists not interested in combining with IAFP

Next Executive Board meeting: January 20-21, 2002, San Diego, CA

International Association for
Food Protection®

Award Nominations

The International Association for Food Protection welcomes your nominations for our Association Awards. We encourage both Members and nonmembers to nominate deserving professionals. To request nomination criteria, contact:

International Association for Food Protection
6200 Aurora Ave., Suite 200W
Des Moines, Iowa 50322-2863
Phone: 800.369.6337; 515.276.3344
Fax: 515.276.8655
Web site: www.foodprotection.org
E-mail: info@foodprotection.org

Nominations deadline is February 18, 2002. You may make multiple nominations. All nominations must be received at the IAFP office by February 18, 2002.

- Persons nominated for individual awards must be current IAFP Members. Black Pearl Award nominees must be a company employing current IAFP Members. NFPA Food Safety Award nominees do not have to be IAFP Members.
- Previous award winners are not eligible for the same award.
- Executive Board Members and Awards Committee Members are not eligible for nomination.
- Presentation of awards will be during the Awards Banquet at IAFP 2002 – the Association's 89th Annual Meeting in San Diego, California on July 3, 2002.

Fred Weber, Awards Committee Chairperson

Nominations will be accepted for the following Awards:

Black Pearl Award – Award Showcasing the Black Pearl

Presented in recognition of a company's outstanding achievement in corporate excellence in food safety and quality.

Sponsored by Wilbur Feagan and F&H Food Equipment Company.

Fellow Award – Distinguished Plaque

Presented to Member(s) who have contributed to IAFP and its Affiliates with quiet distinction over an extended period of time.

Honorary Life Membership Award – Plaque and Lifetime Membership in IAFP

Presented to Member(s) for their devotion to the high ideals and objectives of IAFP and for their service to the Association.

Harry Haverland Citation Award – Plaque and $1,000 Honorarium

Presented to an individual for years of devotion to the ideals and objectives of IAFP.

Sponsored by DiverseyLever/U.S. Food Group.

Harold Barnum Industry Award – Plaque and $1,000 Honorarium

Presented to an individual for outstanding service to the public, IAFP and the food industry.

Sponsored by NASCO International, Inc.

Educator Award – Plaque and $1,000 Honorarium

Presented to an individual for outstanding service to the public, IAFP and the arena of education in food safety and food protection.

Sponsored by Nelson-Jameson, Inc.

Sanitarian Award – Plaque and $1,000 Honorarium

Presented to an individual for outstanding service to the public, IAFP and the profession of the Sanitarian.

Sponsored by Ecolab, Inc., Food and Beverage Division.

Maurice Weber Laboratorian Award – Plaque and $1,000 Honorarium

Presented to an individual for outstanding contributions in the laboratory, recognizing a commitment to the development of innovative and practical analytical approches in support of food safety.

Sponsored by Weber Scientific.

International Leadership Award – Plaque, $1,000 Honorarium and Reimbursement to Attend IAFP 2002

Presented to an individual for dedication to the high ideals and objectives of IAFP and for promotion of the mission of the Association in countries outside of the United States and Canada.

Sponsored by Kraft Foods.

NFPA Food Safety Award – Plaque and $3,000 Honorarium

Presented to an individual, group, or organization in recognition of a long history of outstanding contribution to food safety research and education.

Sponsored by National Food Processors Association.

Criteria available at www.foodprotection.org

Past Awardees

BLACK PEARL AWARD

Sponsored by Wilbur Feagan and F & H Food Equipment Company, Springfield, Missouri

1994–HEB, Co., San Antonio, Texas
1995–Albertson's Inc., Boise, Idaho
1996–Silliker Laboratories Group, Inc., Homewood, Illinois
1997–Papetti's of Iowa Food Products, Inc., Lenox, Iowa
1998–Kraft Foods, Inc., Northfield, Illinois
1999–Caravelle Foods, Brampton, Ontario, Canada
2000–Zep Manufacturing Company, Atlanta, Georgia
2001–Walt Disney World Company, Lake Buena Vista, Florida

FELLOWS AWARD

1998–Larry Beuchat, Lloyd Bullerman, Frank L. Bryan Michael P. Doyle, Harry Haverland, Elmer M. Marth, and Edmund A. Zottola
1999–A. Richard Brazis, Michael H. Brodsky, James M. Jay, Robert T. Marshall, Lawrence A. Roth, and Earl O. Wright
2000–John C. Bruhn, Cameron R. Hackney, Bruce E. Langlois, and Lloyd O. Luedecke
2001–Ann Draughon and Ewen C. D. Todd

HONORARY LIFE MEMBERSHIP AWARD

1957–J. H. Shrader
1958–H. Clifford Goslee
1959–William H. Price
1960–None Given
1961–Sarah Vance Dugan
1962–None Given
1963–C. K. Johns and Harold Macy
1964–C. B. and A. L. Shogren
1965–Fred Basselt and Ivan Parkin
1966–M. R. Fisher
1967–C. A. Abele and L. A. Black
1968–M. P. Baker and W. C. Frazier
1969–John Faulkner
1970–Harold J. Barnum
1971–Wiliam V. Hickey
1972–C. W. Dromgold and E. Wallenfeldt
1973–Fred E. Uetz
1974–H. L. Thomasson and K. G. Weckel
1975–A. E. Parker
1976–A. Bender Luce
1977–Harold Heiskell
1978–Karl K. Jones
1979–Joseph C. Olson, Jr.
1980–Alvin E. Tesdal and Laurence G. Harmon
1981–Robert M. Parker
1982–None Given
1983–Orlowe Osten
1984–Paul Elliker
1985–Patrick J. Dolan, Franklin W. Barber, and Clarence K. Luchterhand
1986–John G. Collier
1987–Elmer Marth and James Jezeski
1988–Kenneth Whaley and Paul J. Pace
1989–Earl Wright and Vernon Cupps
1990–Joseph E. Edmondson
1991–Leon Townsend and Dick B. Whitehead
1992–A. Richard Brazis and Harry Haverland
1993–None Given
1994–Ken Kirby
1995–Lloyd B. Bullerman and Robert T. Marshall
1996–Richard C. Swanson
1997–Frank L. Bryan
1998–H. V. Atherton and David D. Fry
1999–Sidney E. Barnard, Michael H. Brodsky, Charles W. Felix, and James L. Smith
2000–William L. Arledge and Robert L. Sanders
2001–John G. Cerveny, Robert Tiffin, and Edmund A. Zottola

HARRY HAVERLAND CITATION AWARD

Sponsored by DiverseyLever/U.S. Food Group, Cincinnati, Ohio

1951–J. H. Shrader and William B. Palmer (posthumously)
1952–C. A. Abele
1953–Clarence Weber
1954–C. K. Johns
1955–R. G. Ross
1956–K. G. Weckel
1957–Fred C. Baselt
1958–Milton R. Fisher
1959–John D. Faulkner
1960–Luther A. Black
1961–Harold S. Adams
1962–Franklin W. Barber
1963–Merle P. Baker
1964–W. K. Moseley
1965–H. L. Thomasson
1966–J. C. Olson, Jr.
1967–William V. Hickey
1968–A. Kelley Saunders
1969–Karl K. Jones
1970–Ivan E. Parkin
1971–L. Wayne Brown
1972–Ben Luce
1973–Samuel O. Noles
1974–John C. Schilling
1975–A. Richard Brazis
1976–James Meany
1977–None Given

1978–Raymond A. Belknap
1979–Harold E. Thompson, Jr.
1980–Don Raffel
1981–Henry V. Atherton
1982–None Given
1983–William B. Hasting
1984–Elmer H. Marth
1985–Ralston B. Read, Jr.
1986–Cecil E. White
1987–None Given
1988–Carl Vanderzant
1989–Clem Honer
1990–None Given
1991–Frank Bryan
1992–Ewen C. D. Todd
1993–Robert C. Tiffin
1994–Sidney E. Barnard
1995–Charles W. Felix
1996–Joseph J. Disch
1997–Earl O. Wright
1998–Anna M. Lammerding
1999–John C. Bruhn
2000–Ann Draughon
2001–Robert B. Gravani

EDUCATOR-INDUSTRY AWARD

1973–Walter A. Krienke
1974–Richard P. March
1975–K. G. Weckel
1976–Burdet H. Heinemann
1977–Elmer H. Marth
1978–James B. Smathers
1979–Joseph Edmondson
1980–James R. Welch
1981–Francis F. Busta

In 1982, this award was split into the Educator Award and the Harold Barnum Industry Award.

HAROLD BARNUM INDUSTRY AWARD

Sponsored by Nasco International, Fort Atkinson, Wisconsin

1982–Howard Ferreira
1983–C. Dee Clingman
1984–Omer Majerus
1985–William L. Arledge
1986–Hugh C. Munns
1987–J. H. Silliker
1988–Kenneth Kirby
1989–Lowell Allen
1990–Roy Ginn
1991–Thomas C. Everson
1992–Ronald Case
1993–David D. Fry
1994–R. Bruce Tompkin
1995–Damien A. Gabis
1996–Dane T. Bernard
1997–John G. Cerveny
1998–None Given
1999–Russell S. Flowers
2000–Kenneth Anderson
2001–William H. Sperber

EDUCATOR AWARD

Sponsored by Nelson-Jameson, Inc. Marshfield, Wisconsin

1982–Floyd Bodyfelt
1983–John Bruhn
1984–R. Burt Maxcy
1985–Lloyd B. Bullerman
1986–Robert T. Marshall
1987–David K. Bandler
1988–Edmund A. Zottola
1989–Vernal Packard
1990–Michael Stiles
1991–William E. Sandine
1992–William S. LaGrange
1993–Irving J. Pflug
1994–Kenneth R. Swartzel
1995–Robert B. Gravani
1996–Cameron R. Hackney
1997–Purnendu C. Vasavada
1998–Ronald H. Schmidt
1999–Eric A. Johnson
2000–Susan S. Sumner
2001–Larry R. Beuchat

SANITARIAN AWARD

Sponsored by Ecolab Inc., Food and Beverage Division, St. Paul, Minnesota

1952–Paul Corash
1953–E. F. Meyers
1954–Kelley G. Vester
1955–B. G. Tennent
1956–John H. Fritz
1957–Harold J. Barnum
1958–Karl A. Mohr
1959–William Kempa
1960–James C. Barringer
1961–Martin C. Donovan
1962–Larry Gordon
1963–R. L. Cooper
1964–None Given
1965–Harold R. Irvin
1966–Paris B. Boles
1967–Roger L. Stephens
1968–Roy T. Olson
1969–W. R. McLean
1970–None Given
1971–Shelby Johnson
1972–Ambrose P. Bell
1973–None Given
1974–Clarence K. Luchterhand
1975–Samuel C. Rich
1976–M. W. Jefferson
1977–Harold Bengsch
1978–Orlowe Osten
1979–Bailus Walker, Jr.
1980–John A. Baghott

1981–Paul Pace
1982–Edwin L. Ruppert
1983–None Given
1984–Harold Wainess
1985–Harry Haverland
1986–Jay Boosinger
1987–Erwin P. Gadd
1988–Kirmon Smith
1989–Robert Gales
1990–Leon Townsend
1991–James I. Kennedy
1992–Dick B. Whitehead
1993–Lawrence Roth
1994–Charles Price
1995–Everett E. Johnson
1996–Leon H. Jensen
1997–Randall A. Daggs
1998–Terry B. Musson
1999–Gloria I. Swick
2000–Norris A. Robertson, Jr.
2001–O. D. "Pete" Cook

MAURICE WEBER LABORATORIAN AWARD

Sponsored by Weber Scientific, Hamilton, New Jersey

2001–Elizabeth M. Johnson

DEVELOPING SCIENTISTS AWARDS

Sponsored by the Foundation Fund, Des Moines, Iowa

1986–	1st	Christine Bruhn
	2nd	Elliott T. Ryser
	3rd	Eileen M. Rosenow
	4th	Lisa M. Flores
	5th	Kamal M. Kamaly
1987–	1st	R. K. Lindenthal
	2nd	Elliott T. Ryser
	3rd	Kathleen M. Knutson
	4th	A. A. Airoldi
	5th	Michelle M. Schaack
1988–	1st	A. A. Airoldi
	2nd	Stephen Ingham
	3rd	Douglas Marshall
	4th	B. J. Overdahl
	5th	P. K. Cassiday
1989–	1st	Nancy Nannen
	2nd	Diane West
	3rd	David Baker
	4th	Karl Eckner
	5th	Hassan Gourama
1990–	1st	Bob Roberts
	2nd	Anna Lammerding
	3rd	Hassan Gourama
	4th	Anna Lambert
	5th	Mona Wahby
1991–	1st	Andrea O. Baloga
	2nd	Elaine D. Berry
	3rd	J. Eric Line
	4th	Donna Williamson
	5th	Keith R. Schneider
1992–	1st	Gary J. Leyer
	2nd	Janice M. Baker
	3rd	Kyle Sashara
	4th	Lynn McIntyre
	5th	Kwang Yup Kim
1993–	1st	Randall K. Phebus
	2nd	J. Eric Line
	3rd	David H. Toop
	4th	Lee-Ann Jaykus
	5th	Tom Yezzi
1994–Oral	1st	J. David Monk
	2nd	Charles Powell
	3rd	Nandini Natraja
Poster	1st	Ratih Dewanti
	2nd	Jitu R. Patel
	3rd	Chen-Jang Liu
1995–Oral	1st	Maria Nazarowec-White
	2nd	Peter Bodnaruk
	3rd	Tina S. Schwach
Poster	1st	James D. Schuman
	2nd	Willie Taylor
	3rd	Wei Tan
1996–Oral	1st	Abbey Nutsch
	2nd	M. Rocelle S. Clavero
	3rd	Robert Williams
Poster	1st	Rod Worobo
	2nd	John Czajka
	3rd	Sherri Kochevar
1997–Oral	1st	Doris D'Souza
	2nd	Paris Leggitt
	3rd	Kunho Seo
Poster	1st	Lisa Lucore
	2nd	Soraya Rosenfield
	3rd	Jeffrey Semanchek
1998–Oral	1st	Peter J. Taormina
	2nd	Brian Shofran
	3rd	Amanda E. Whitfield
Poster	1st	Aysegul Eyigor
	2nd	Ronald D. Smiley
	3rd	Jianming Ye
1999–Oral	1st	Susan Abraham
	2nd	Peter J. Taormina
	3rd	Robert L. Sudler, Jr.
Poster	1st	Ziad W. Jaradat
	2nd	Kazue Takeuchi
	3rd	Yongsoo Jung

2000–Oral	1st	Peter Taormina
	2nd	Nathanon Trachoo
	3rd	Madonna Cate
Poster	1st	William Weissinger
	2nd	Marlene Janes
	3rd	Robert Williams
2001–Oral	1st	Marsha Harris
	2nd	Shin-Hee Kim
	3rd	Robert Williams
Poster	1st	Jarret Stopforth
	2nd	Yong Soo Jung
	3rd	Revis Chmielewski

NFPA FOOD SAFETY AWARD

Sponsored by The National Food Processors Association, Washington, District of Columbia

1998 Food Research Institute at the University of Wisconsin-Madison, Madison, Wisconsin
1999 Michael P. Doyle
2000 Elmer H. Marth
2001 R. Bruce Tompkin

SAMUEL J. CRUMBINE AWARD

Sponsored by the Conference for Food Protection in cooperation with American Academy of Sanitarians; Association of Food and Drug Officials; Foodservice & Packaging Institute, Inc.; International Association for Food Protection; International Food Safety Council; National Association of County and City Health Officials; National Environmental Health Association; NSF International; and Underwriters Laboratories, Inc.

From 1955 to 1966 two awards were given: the first for general environmental health, the second for food protection. From 1968 to 1973, the award was suspended due to a general lack of innovation in food protection programs during that period.

1955 Cowlitz-Wahkiakum County Department of Public Health, Washington
New York City Department of Public Health, New York City, New York
1956 Tulsa City-County Department of Public Health, Tulsa, Oklahoma
Macon-Bibb-Jones County Department of Public Health, Georgia
1957 San Jose Department of Public Health, San Jose, California
San Diego County Department of Public Health, San Diego, California
1958 Spokane County Department of Public Health, Spokane, Washington
Los Angeles County Department of Public Health, Los Angeles, California
1959 San Diego County Department of Public Health, San Diego, California
Salt Lake City Department of Public Health, Salt Lake City, Utah
1960 Marion County Department of Public Health, Salem, Illinois
San Bernardino County Department of Public Health, San Bernardino, California
1961 Albuquerque Environmental Health Department, Albuquerque, New Mexico
Philadelphia County Department of Public Health, Philadelphia, Pennsylvania
1962 Rocky Mount Department of Public Health, Rocky Mount, North Carolina
Seattle-King County Department of Public Health, Seattle, Washington
1963 Hamilton County Department of Public Health, Cincinnati, Ohio
Lake County County Department of Public Health, Waukegon, Illinois
1964 Orange County Department of Public Health, Santa Ana, California
1965 Spokane County Department of Public Health, Spokane, Washington
Albuquerque Environmental Health Department, Albuquerque, New Mexico
1966 Imperial County Department of Public Health, El Centro, California
Jefferson County Department of Public Health, Birmington, Alabama
1967 Salt Lake City Department of Public Health, Salt Lake City, Utah
1974 Lexington-Fayette County Department of Public Health, Lexington, Kentucky
1975 None given
1976 Region VI Department of Public Health, Roswell, New Mexico
1977 Los Angeles County Department of Public Health, Los Angeles, California
1978 Arlington County Department of Public Health, Arlington, Virginia
1979 Suffolk County Department of Public Health, Riverhead, Virginia
1980 Allegheny County Department of Public Health, Pittsburgh, Pennsylvania
1981 Nassau County Department of Public Health, Mineola, New York
1982 Winnebago County Department of Public Health, Rockford, Illinois
1983 Pima County Department of Public Health, Tucson, Arizona
1984 Southeastern District Department of Public Health, Idaho
1985 Montgomery County Department of Public Health, Dayton, Ohio
1986 Tri-County Department of Public Health, Colorado

1987 Snohomish Health District, Everett, Washington
1988 San Bernardino County Department of Public Health, San Bernardino, California
1989 Albuquerque Environmental Health Department, Albuquerque, New Mexico
1990 San Joaquin County Environmental Health Division, Stockton, California
1991 Tacoma-Pierce County Health Department, Tacoma, Washington
1992 Boulder County Health Department, Boulder, Colorado
1993 Allegheny County Pennsylvania Health Department, Pittsburgh, Pennsylvania
1994 Du Page County Health Department, Wheaton, Illinois
1995 None given
1996 Snohomish Health District, Everett, Washington
1997 Madison Department of Public Health, Madison, Wisconsin
1998 Clark County Health District, Las Vegas, Nevada
1999 Lake County Health Department, Waukegan, Illinois
2000 Olmsted County Public Health Services Rochester, Minnesota
2001 Maricopa County Environmental Health, Phoenix, Arizona

C. B. SHOGREN MEMORIAL AWARD

1972-Iowa Affiliate
1973-Kentucky Affiliate
1974-Washington Affiliate
1975-Illinois Affiliate
1976-Wisconsin Affiliate
1977-Minnesota Affiliate
1978-None Given
1979-New York Affiliate
1980-Pennsylvania Affiliate
1981-Missouri Affiliate
1982-South Dakota Affiliate
1983-Washington Affiliate
1984-None Given
1985-Pennsylvania Affiliate
1986-None Given
1987-New York Affiliate
1988-Wisconsin Affiliate
1989-Georgia Affiliate
1990-Texas Affiliate
1991-Georgia Affiliate
1992-Georgia Affiliate
1993-New York Affiliate
1994-Illinois Affiliate
1995-Wisconsin Affiliate
1996-Wisconsin Affiliate
1997-Florida Affiliate
1998-Ontario Affiliate
1999-Wisconsin Affiliate
2000-Michigan Affiliate
2001-Florida Affiliate

MEMBERSHIP ACHIEVEMENT AWARDS

HIGHEST PERCENTAGE INCREASE

1998-Alabama Affiliate
1999-Kansas Affiliate
2000-Alberta Affiliate
Kansas Affiliate
2001-Mexico Affiliate

HIGHEST NUMBER INCREASE

1986-Iowa Affiliate
1987-Florida Affiliate
1988-Florida Affiliate
1989-California Affiliate
1990-California Affiliate
1991-Illinois Affiliate
1992-California Affiliate
Illinois Affiliate
1993-California Affiliate
1994-California Affiliate
1995-Texas Affiliate
1996-California Affiliate
1997-California Affiliate
1998-California Affiliate
1999-California Affiliate
2000-California Affiliate
2001-California Affiliate
Georgia Affiliate

New Members

CHILE

Guillermo Figueroa-Gronemeyer
University of Chile
Macul, Santiago

Hugo V. Zunino
Labser LTD.
Los Cerrillos, Santiago

FRANCE

Paul Martin
Institut Pasteur
Paris Cedex

IRELAND

Dave O'Beirne
University of Limerick
Limerick

MEXICO

Lorena Noriega Orozco
Ciad, A.C.
Guaymas, Sonora

TAIWAN

Philip C. Chang
National Taiwan Ocean University
Keelung, R.O.C.

THAILAND

Payap J. Tosinthiti
Chiang Mai

UNITED STATES

California

David L. Davis
Odwalla, Dinuba

Barry I. Ford
Brown Cow West Corp.
Antioch

Connecticut

David J. Dzurec
University of Connecticut
Storrs

Per C. Undeland
The Perrier Group of America
Greenwich

Georgia

Dharmendrasingh M. Pawar
University of Georgia
Athens

Alling H. Yancy
Gold Kist Inc.
Atlanta

Illinois

Patti Nomm
McHenry County Health Dept.
Woodstock

Massachusetts

Charles P. Johnston
Ultraclenz
Weymouth

Minnesota

Joe Poluka
Marigold Foods LLC
Minneapolis

Missouri

Bruce R. Myers
DairiConcepts LP
Springfield

New Jersey

Howard A. Cash
Lonza, Inc.
Annandale

New York

Esperanza Wingard
Crowley Foods Inc.
Binghamton

Nevada

Anna Vickrey
The State of Nevada
Reno

Pennsylvania

Kate Koslosky
Westlake Plastics Co.
Lenni

Charles Medellin
Readington Farms, Inc.
Easton

Wisconsin

Edith V. Zambrana
Kraft Foods
Madison

VENEZUELA

Yasmina Barboza de Martinez
Universidad Del Zulia
Maracaibo, Zulia

Seafood is Leading Cause of Foodborne Illness Outbreaks

Contaminated seafood is the leading known cause of foodborne illness outbreaks, according to a new report published by the Center for Science in the Public Interest (CSPI). The next biggest causes are eggs, fruits and vegetables, beef and poultry. Those findings are in CSPI's *Outbreak Alert!* report, which was released at the annual meeting of the American Public Health Association.

Based on approximately 1,600 food-poisoning outbreaks affecting more than 70,000 individuals between 1990 and 2001, CSPI found: Seafood caused 340 outbreaks with 5,133 cases of foodborne illness. Eggs and egg dishes caused 271 outbreaks with 10,827 cases. Fruits and vegetables caused 148 outbreaks with 9,413 cases of food poisoning. Beef, the meat product most likely to be linked to an outbreak, caused 134 outbreaks with 6,089 cases of foodborne illness.

Contaminated poultry caused 79 outbreaks with 4,279 cases. "Seafood and other foods regulated by the Food and Drug Administration (FDA) caused four times more outbreaks than meat and poultry products, which are regulated by the US Department of Agriculture (USDA)," said Caroline Smith DeWaal, CSPI's director of food safety. "Despite that, the FDA has only one-tenth as many food safety inspectors, and about one-third of the inspection budget of the USDA. That represents a huge gap in consumers' protection against unsafe food." FDA currently has only 150 inspectors to check on 3.7 million shipments of imported food and inspects domestic food plants only once every five years.

FDA recently informed Congress that it needs significant new resources to protect the food supply, including $800 million to enhance domestic inspections and $540 million to inspect 20 percent of the shipments of imported food. Because of the threat of bioterrorism, the Bush Administration requested emergency funding from Congress, including $61 million to increase imported food inspections and to modernize the import data system.

"The Bush Administration has acknowledged serious gaps in FDA's food safety program that need to be repaired. In addition to increasing FDA's funding, the Bush Administration and Congress should combine federal food safety programs into a single food safety agency with modern tools to address new hazards, like bioterrorism and mad cow disease," said DeWaal. *Outbreak Alert!* published annually by CSPI since 1999, provides the most comprehensive listing of foodborne illness outbreaks linked to the food source and the regulating agency. The report is compiled from authoritative sources, including the Centers for Disease Control and Prevention (CDC), state and local health departments, and medical and scientific journals. Outbreaks of unknown origin, i.e. where no food or pathogen could be identified, are not included in *Outbreak Alert!*

International Association for Food Protection®

New Center to Study Effect of Consuming Toxicants in Fish

The University of Illinois College of Veterinary Medicine is home to a new federally funded center that will study the effects of exposure to toxicants in fish being eaten in large quantities by Laotian and Hmong refugees in Green Bay and Appleton, WI. Researchers from five institutions will work in the UI-based consortium, which also will develop outreach programs to help the refugees reduce their consumption of the fish contaminated with polychlorinated biphenyls and methyl mercury.

The FRIENDS Children's Environmental Health Center at the UI was among four new children's environmental health research centers announced in Cincinnati. They were established under a joint program of the National Institute of Environmental Health Sciences and the Environmental Protection Agency. The centers each will receive about $1 million per year for the next five years.

FRIENDS stands for Fox River Environment and Diet Study. The Fox River cuts through the heart of the city of Green Bay. It is one of the most heavily PCB-contaminated sites in the Great Lakes basin and is the single largest source of PCBs entering Lake Michigan.

"This center will build on several already established research collaborations and will be organized around refugees we have been recruiting in this area. A large percentage of these refugee families is at high risk for PCB exposure. While methyl mercury levels are not as high, we want to know if methyl mercury exposure has adverse health ramifications, either separately or in combination with PCBs," said Susan L. Schantz, who will serve as director.

PCBs and methyl mercury often occur together in the environment, but there has been

little research that addresses the health effects resulting from combined exposure. Members of the refugee groups have been involved in the design of the study and will have continuing roles, said Schantz, a professor of veterinary biosciences and of psychology. In addition to studying the health impact of chemicals in the fish, researchers will be educating the communities about safe fishing locations, which species of fish are safe to eat, and preparation and cooking methods to help limit their exposure to the toxicants. "Because of language and cultural barriers, many of these people are largely unaware of the risks associated with eating the fish," Schantz said.

Researchers will be looking specifically at the effect of eating contaminated fish on the motor, sensory and mental development of the refugees' children. They also will study, in laboratory rodents, the mechanisms by which the pollutants cause neurological harm. The UI center also will involve researchers at the University of Illinois at Chicago, Michigan State University, the State University of New York at Buffalo, the New York State Department of Health, and the University of Texas Health Science Center at Houston.

Earlier this year, Schantz and colleagues published findings showing that adults over age 49 who had consumed more than 24 pounds of PCB-contaminated sport-caught fish for several years now are having problems learning and remembering new verbal information. It was the first study to show that such problems were occurring in adults. Previous studies had focused on the effects of exposure on children.

In a combined ceremony, the NIEHS and EPA also announced the establishment of a center at the Children's Hospital of Cincinnati, which will be devoted to assessing and reducing the impact of home and neighborhood pollutants on children's hearing, behavior and test scores. Separate centers at the University of California at Davis and the Robert Wood Johnson Medical School of the University of Medicine and Dentistry of New Jersey will be devoted to the possible role of pollutants on childhood autism.

Scientists Plan Multi-Pronged Attack on *E. coli* O157:H7

New techniques are on the horizon to control the *E. coli* O157:H7 bacterium in beef and dairy cattle, which could help the beef industry fight the food safety and environmental contamination threat, a leading *E. coli* researcher told attendees at the recent National Beef Science Seminar in Lethbridge, Alberta, Canada.

"Currently, *E. coli* O157:H7 outbreaks and beef product recalls are a significant threat to the Canadian beef industry, since cattle are the major reservoir of the bacterium, it is vital to develop control measures that reduce the risk of transmitting *E. coli* O157:H7 to humans," said Dr. Tim McAllister, a Lethbridge Research Centre ruminant nutritionist and microbiologist. Effective control of the pathogen requires reducing the frequency and intensity of shedding in cattle, he said. Controls range from environmental strategies to vaccines.

McAllister is examining environmental controls for the bacterium. "Studies have shown that *E. coli* O157:H7 can survive for weeks and months in livestock production environments, which may enable the organism to be transmitted back to cattle through contaminated feed or water. This creates a cycle of infection that permits the pathogen to survive in cattle herds," he said.

Minimizing contamination of water troughs and feed bunks together with proper management will help reduce the spread of *E. coli* to cattle, crops, water sources and ultimately humans, he said. Composting is another solid on-farm control measure. If managed properly, the heat inside the compost pile kills pathogens such as *E. coli* O157:H7. However, proper control measures at the farm and feedlot level are not enough. Since we are talking about a cycle, controlling *E. coli* O157:H7 requires suppression at each point in the cycle.

McAllister expects the approaches under study at the Centre will complement those being developed by other Canadian and international researchers. "Probiotics is a new approach. Probiotics, the administering of beneficial microorganisms, may improve an animal's intestinal microbial balance, preventing the growth of pathogenic organisms. Probiotic bacteria have proven effective for reducing the length of time the rumen harbors *E. coli* O157:H7. Bacteriophages infect and kill *E. coli* O157:H7," McAllister explained. However, further research is required to make this method consistently effective and viable.

Still another technique may be vaccination. A vaccine developed by the University of British Columbia and Veterinary Infectious Disease Organization (VIDO) is currently being field tested. "It reduces the level of the bacteria harbored in cattle intestines, but it doesn't reduce it to zero. Dietary controls could be an option, but conflicting studies about the effect of the diet on *E. coli* control means more research needs to be done," McAllister said. At the packer level, irradiation, which kills bacteria, is under consideration.

From a scientific perspective, McAllister said this fight against *E. coli* O157:H7, a relatively new strain of *E. coli* first identified in

1982, could prove beneficial. "It may provide valuable lessons for battling new bacterial threats that may evolve in the future." While researchers try to find methods of controlling *E. coli* O157:H7, McAllister said more emphasis should be placed on proper food handling and cooking protocols. "We will never completely eliminate *E. coli* O157:H7. There is no such thing as zero risk," he cautioned.

Iowa State University Professor to Develop Online Food Safety Virtual Reference Desk

The College of Family and Consumer Sciences at Iowa State University has received a $475,000 grant from the US Department of Agriculture to create a virtual reference desk on food safety. James Huss, associate professor of hotel, restaurant and institution management, and Daniel Henroid, adjunct instructor in the same program, will create a comprehensive online database targeted to food service operators and consumers. It will allow users of all ages to ask questions of food safety experts and it will feature frequently asked questions about food safety. Iowa State will create three possible models for the online reference. An advisory group of 10 academic, government, industry and consumers will select the one to be implemented.

The selection will be posted on the ISU Extension Service Web site for a six-month pilot study. "National participation and collaboration is crucial to the project's long-term integrity and sustainability," says Huss. The site will feature answers reached by a consensus of experts.

General Outbreaks of Infectious Intestinal Disease Linked with Poultry, England and Wales 1992-1999

Between 1992 and 1999, 1,426 foodborne general outbreaks of infectious intestinal disease (IID) were reported to the Public Health Laboratory Service Communicable Disease Surveillance Centre. A fifth were associated with the consumption of poultry. Chicken was implicated in almost three quarters of these outbreaks, turkey in over a fifth and duck in 2% of outbreaks.

The organisms most frequently reported were *Salmonella* (30% of outbreaks), *Clostridium perfringens* (21%) and *Campylobacter* (6%). Over 7,000 people were affected, with 258 hospital admissions and 17 deaths. During the summer, outbreaks were mainly of salmonellosis and attributed to the consumption of chicken. In December, *C. perfringens* and turkey were the organism and vehicle most often implicated. Most outbreaks occurred on commercial catering premises (56%) or in private houses (21%). The highlight linked with poultry products, probably due, at least in part, to the vaccination of poultry flocks.

BSE Inspection Checklist Available on the CVM Internet Home Page

FDA's Center for Veterinary Medicine (CVM) has made available the Bovine Spongiform Encephalopathy (BSE) Inspection Checklist on the Center's Home Page at www.fda.gov/cvm/index/updates/bsecheck.htm. This checklist is to be used by Federal and State inspectors to determine compliance with FDA's ruminant feed (BSE) regulations, Code of Federal Regulations, Title 21, Part 589.2000. This rule, that prohibits the use of most mammalian protein in feeds for ruminant animals, was implemented to prevent the establishment and amplification of BSE through feed in the United States. The rule became effective on August 4, 1997.

Inspections of over 10,000 renderers, feed mills, ruminant feeders, and others (such as protein blenders) have been conducted to determine compliance with the BSE feed regulations. The majority of these inspections (around 80%) were conducted by State officials and the remainder by FDA. A checklist has been used to record information on the compliance with the rules. The checklist that is being made available on the CVM Home Page is a revised version intended for use in future inspections.

Outbreak of Gastroenteritis in Military Recruits in Germany — Suspected Cryptosporidiosis

At the beginning of August 2001, after a five-day field exercise, about 200 out of 450 soldiers in Germany's armed forces became ill with acute gastroenteritis, peaking after about a week. The incubation period was assumed to be within a range of two to 10 days, and duration of the illness was between several days and two weeks. The recruits were stationed in barracks with a permanent kitchen catered for by a cook. The meals were transported into the field in insulating containers or eaten in the barracks. Drinks included mainly bottled mineral water, juice concentrate diluted with tap water, and tea. The menu included various hot and cold meals and leafy and mixed salads. During the exercise

the weather was very hot and no rain fell. Sheep graze regularly on the field. Preliminary results – Analyses of stool specimens helped to rule out bacterial pathogens, such as *Salmonella*, *Yersinia*, *Shigella*, *Escherichia coli*, or *Bacillus cereus* only a few days into the investigation. At first, no diagnostic techniques were used to identify parasites. Only when one of the cases was admitted to hospital were diagnostic tools used to identify parasites, and cryptosporidia were found. In 15 of 217 of the stool specimens requested after this from recovered and still ill participants in the exercise, cryptosporidium enzyme linked immunosorbent assay found cryptosporidium antigen. These findings were confirmed by immunofluorescence assay and microscopy. The low number of positives may be due to the fact that the specimens were taken only two to three weeks after onset of illness. Most people did not have gastrointestinal complaints any more and therefore would not have excreted oocysts. Analysis of food samples did not show any fecal or bacterial contamination. No investigation for cryptosporidium was performed because at this point no parasites were taken into consideration.

The result of the microbiological analysis of the drinking water on the site was inconclusive. A second analysis of the reservoir for drinking water and the kitchen water supply for cryptosporidia (filtration of 300 litres) and of 5 litres of mineral water imported from Italy yielded no results, as did an examination of sheep droppings.

Further proceedings – the results imply that this outbreak may have been caused by *Cryptosporidium parvum*, but the results of the investigation and analysis are inconclusive as yet. Further measures to be implemented include completing a standardized questionnaire about the history and course of illness and serological testing for all participants in the exercise for cryptosporidium antibodies (these tests are not part of routine diagnostic measures).

New Notification Program Provides Electronic Updates on Meat, Poultry, and Egg Product Testing Samples

The US Department of Agriculture's Food Safety and Inspection Service has launched a new notification system that will provide electronic status reports on testing samples taken from meat, poultry, and egg product establishments. The Laboratory Electronic Application for Results Notification system will allow FSIS field personnel, agency staff, establishments, and state officials, to electronically monitor information on species identification, food chemistry, microbiological samples, and completed *Salmonella*/HACCP sets.

After a pilot test in several FSIS districts, LEARN, as the program is known, is now online across the country. LEARN is an automated process to track each sample as it is received, analyzed, and the results are reported. The reports state whether a microbiological test – such as *Listeria monocytogenes* in ready-to-eat meat and poultry products or *E. coli* O157:H7 in raw ground beef products – initially indicates the presence of a pathogen. When confirmation testing on a potential or presumptive positive is complete, a report with the final analysis is posted.

LEARN replaces the notification system that used a combination of phone calls, fax, and multiple computer applications to inform field personnel and establishments of test results. LEARN combines the previous delivery methods into one application to provide faster, more up-to-date information while using fewer agency resources.

"The agency has incorporated suggestions from FSIS field personnel and industry in developing this program. LEARN provides increased feedback to both inspectors and establishments on the status of samples from the time they are received at the laboratories until the analysis is complete," said Thomas J. Billy, FSIS administrator.

Sample status information will be automatically updated several times each day. Establishments and state officials will receive updated E-mail reports for individual samples. Agency personnel can access the information through an FSIS intranet site. Once logged on to the FSIS server, staff can check on samples from individual establishments or view circuit, district, and management summaries of results. FSIS personnel will also be able to access information on residue samples through LEARN.

The system has safeguards in place to ensure that only authorized officials will have access to the information. Establishment officials receive results only from their plant and state officials receive results only for establishments within their state. Each sample is identified with a collection date, the plant's establishment number, and a corresponding form number. At the laboratories, each sample is marked with a lab code and assigned a unique internal lab number.

FSIS is responsible for ensuring that meat, poultry, and egg products are safe, wholesome, and correctly labeled. As part of that responsibility, FSIS conducts verification sample testing to monitor microbiological, chemical, and other types of contamination.

Industry Products

FoodHandler, Inc.

FoodHandler Inc. New High-Heat Pan Liners and Oven Bags Save Labor

FoodHandler Inc., has introduced PanPals™, a new line of labor-saving, high-heat pan liners and oven bags. PanPals™ were developed to reduce overtime and turnover by practically eliminating one of the toughest and least favorite kitchen cleaning tasks, soaking and scrubbing pots and pans.

Enhancing food safety, PanPals™ allow food to be quickly cooled and warmed, reducing time in the temperature "danger" zone, and prevent bacterial build-up from pans not fully cleaned during typical washing. And since food can be cooked at higher temperatures without burning using the products, cooking times can be lowered.

The temperature-resistant pan liners and oven bags also reduce waste by cooking food more evenly, locking in moisture and color, and eliminating burnt-on waste. Using PanPals™ can also extend the life of insert pans and bake ware, conserve hot water and chemical detergents and reduce plumbing expenses.

PanPals are designed to fit standard-sized commercial pans, pots and roasters and can be used in a conventional or convection oven, microwave, slow cooker or steamer. The liners and bags can withstand temperatures between -70°F and 400°F.

FoodHandler Inc., Westbury, NY

Reader Service No. 337

Cox Technologies and Volk Enterprises Form Alliance to Bring Vitsab® Smart Labels to Poultry Industry

Cox Technologies, Inc. has announced a sales alliance with Volk Enterprises, Inc., the Turlock, California-based company responsible for the Pop-Up® Timer popular at Thanksgiving, as well as other innovative products within the poultry industry.

Cox Technologies and Volk Enterprises will combine forces to bring Cox's Vitsab® smart labels to the poultry industry and other emerging sectors in the marketplace. The Vitsab® product is an inexpensive adhesive label that is attached to wholesale food cartons during distribution. A simple, color-changing dot reveals whether a particular carton has been exposed to damaging high temperatures.

Temperature abuse of perishable food, including poultry products, is a major concern along the "cold chain," in which products move from supplier to distribution warehouses and, finally, to retail stores.

Temperature abuse can cause degradation of weight, quality and appearance. In extreme cases, temperature abuse can lead to contamination, such as *E. coli*. The Vitsab® product provides much-needed temperature monitoring along the cold chain and also helps the retailer with stock management.

Cox Technologies, Belmont, NC

Reader Service No. 338

bioMérieux Introduces IDEAL Air Sampler

bioMérieux announces the air IDEAL air sampler. The air IDEAL employs the impaction principle and utilizes standard 100 mm or contact plates for sample collection and growth.

Listed below are a few key features the air IDEAL offers:

- Complies with ISO/DIS 14698-1 recommended draft standard
- Light-weight (under 3 lbs.) easy-to-handle and use
- Smooth monoshell surface is easy to clean
- Complete system supplied with 5 interchangeable sampling screens
  - Sampling screens are autoclaveable at 134°C for 18 minutes
  - 1/4 turn screw-on/off sampling screen

- Air IDEAL is UL, CE and CSA marked

bioMérieux, Inc., Hazelwood, MO

Reader Service No. 339

Palmer "Slip-Fit" Bimetal Dial Thermometers from the Instrumentation Group

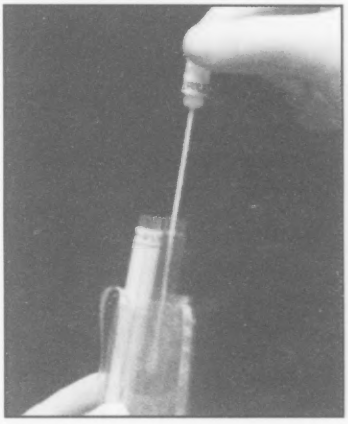
Palmer Instruments, Inc. offers a bimetal dial thermometer designed as a quick, cost-saving replacement for industrial liquid-in-glass type units, with no accuracy loss. "Slip-Fit" dial thermometers are designed to "slip" into existing industrial thermometer thermowells and "fit" by means of a tapered bulb chamber. The tapered bulb provides the identical metal-to-metal contact and resulting heat transfer as the replaced industrial-type thermometer, but without the possibility of glass tube breakage and resulting liquid fill contamination.

Slip-Fit cases, bezels, and stems are constructed from polished type 304 stainless steel. Either 3" or 5" high-visibility, anti-parallax dial sizes are available. Two case styles are offered: back connected or versatile all angle that adjusts to virtually any viewing angle. Cases are hermetically sealed at the factory to seal out moisture and prevent icing and coil freeze-up. Slip-Fits utilize a 1 1/4" - 18 plated brass swivel nut fitting, again to easily accept thermocouples commonly used with the industrial thermometers they replace.

Slip-Fit dial thermometers are also available with another unique Palmer feature. The "Replaceable Element" option allows quick, cost-saving replacement of the thermometer's internal sensing element and dial face assembly while leaving the external case, fitting, and stem components in place. "Replaceable Element" models also allow thermometer replacement or temperature range change in situ, reducing costly process down time.

Palmer Instruments, Inc., Asheville, NC

Reader Service No. 340



Weber Scientific

Weber Scientific New Anthrax Swab Kit Meets CDC Procedures

Weber Scientific has introduced a new anthrax environmental swab collection kit. This kit has been designed to comply with sample collection procedures just released by the Centers for Disease Control and Prevention (CDC).

According to Weber Scientific president Fred Weber, key users of this kit will be state and local health officers, Environmental Protection Agency (EPA) laboratories, the Federal Bureau of Investigation (FBI) and private environmental testing companies.

Mr. Weber reports that this swab kit meets the specifications in the CDC report, *Procedures for Collecting Surface Environmental Samples for Culturing Bacillus anthracis*, published on November 13, 2001. "There are no other products available that I know of specifically designed for this job. It will help to simplify environmental sampling for anthrax spores while encouraging use of the recommended technique," he stated.

Anthrax terrorism has hit especially close to home at Weber Scientific, making this new product that much more meaningful. Weber headquarters is around the corner from the Hamilton, NJ postal facility that handles their mail. The facility has been closed since anthrax contamination was discovered as the cause of a number of confirmed cases of both the cutaneous and inhalation forms of the disease. Additionally, Mr. Weber recounts that an employee was instructed to begin prophylactic treatment with the antibiotic Cipro. "There are obviously a number of special reasons why we feel it is imperative that people know about this new product," he said.

The ready-to-use kit consists of everything necessary for anthrax sample collection, including a sterile swab capped inside a color-coded test tube, another color-coded capped test tube containing sterile phosphate-buffered saline hydrating solution, a pair of sterile gloves, a bleach towelette and two self-sealing plastic bags.

The procedure is straightforward. Put on the sterile gloves, peel open the pack, remove the red coded cap and then remove the white capped swab. Place the swab in the red tube, close the cap so the swab is in contact with the hydrated sponge and squeeze the base of the red tube to moisten the swab tip. Remove the swab from the red tube, sample the surface or equipment and return the swab to the white tube. Label the white tube and place in a self-sealing bag. Clean the outside of the bag with the one-half percent bleach wipe and place the cleaned

sealed bag into the second self-sealing bag for transport to the laboratory.

In the laboratory, the transport tube can then be used to begin testing as it has been validated to withstand the required 65°C heat-shocking.

Weber Scientific, Hamilton, NJ

Reader Service No. 341

New from Biotest! Improved HYCON® Contact Slides!

Biotest Diagnostics offers the HYCON® Contact slide. Now even better for determining microbial contamination levels on surfaces!

- Easier to open – the package was extended about 1 cm to allow for a better grasp and a quick opening, even with gloves on!
- Available in Gamma–Sterilized and double packed TC – for aseptic transfer into cleanrooms.
- Great for Isolators – the integrated hole allows for hanging during gaseous decontamination.
- Clearly labeled – the lot number is now imprinted into the plastic tab.
- Modified packaging – Now available in packages of 20 or 100.

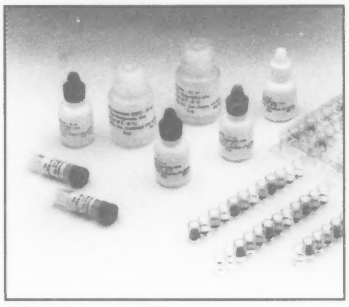
Hycon contact slides still feature:

- Flexible culture media carrier to ensure contact with curved or irregular surfaces.
- 25cm² of surface contact meets international guidelines USP and EP.
- Individual packaging
  - Prevents potential contamination
  - Reduces cost and waste since the exact number of slides can be used as needed
  - Can be securely sealed after use to avoid lost lids and ruined samples
- Standard and selective media available.

Biotest offers the HYCON® System – a complete line of environmental monitoring products.

Biotest Diagnostics Corporation, Denville, NJ

Reader Service No. 342



SafePath Laboratories LLC

SafePath Announces Its Trichinella Swine Antibody ELISA Kit

SafePath Laboratories announces the introduction of its' Trichinella swine antibody ELISA kit. The kit will detect antibodies to Trichinella spiralis using blood, serum, plasma or tissue fluid (meat juice) and can be completed in approximately 30 minutes.

The assay has been cleared for veterinary use by the USDA Biologics division and can be used on hogs both ante and post mortem. The kit is currently being used in the pilot program of the trichinae certification program (www.aphis.usda.gov/vs/trichinae), which will provide consumers of fresh pork certification that the product is free of Trichinella.

With minimal automation, the assay is also ideal for use in the slaughterhouse or any other large volume setting. All components, except for the 20× wash concentrate, are ready to use straight out of the container.

The assays are performed at room temperature and the results can be read visually or with an ELISA reader. All assays are in a 1×8, 96-test breakaway microwell format so any number of samples from 1 to 94 may be run simultaneously.

SafePath Laboratories LLC, Carlsbad, CA

Reader Service No. 343

Q Scientific Instruments' PDA-based pH Meter Accepts Non-glass Probes

The powerful and versatile IQ400 pH system can be used as either a handheld or benchtop pH meter. The system is a pH module coupled with the best selling Handspring Visor™ PDA (personal digital assistant). This pH meter/handheld computer has processor speeds up to 100 times faster with 1,000 times more memory than other pH meters. The meter accepts both traditional glass electrodes and rugged non-glass, silicon chip sensor pH probes. Features include touch-screen graphics display, pop-up windows and on-screen trouble-shooting guides for each function. You can even save digitized hand-written notes and sketches with your pH readings. Other IQ- 400 features are high/low pH level alerts, recalibration alarms, automatic buffer recognition, save/recall of up to 9,999 records and automatic temperature compensation. Data can be downloaded to your PC with the push of a button.

IQ Scientific Instruments, Inc., San Diego, CA

Reader Service No. 344

Wahl's DIGI-STEM® Process Thermometer from the Instrumentation Group

Wahl Instruments, Inc. presents the newly modified DIGI-STEM series of self-powered digital thermometer systems that measure process temperatures to 0.1° resolution. DIGI-STEMs incorporate type K thermocouple temperature sensors. This state-of -the-art stem thermometer provides accuracy, legibility, and economy. The 1" LCD readings can be easily seen from distances up to 20 feet (6 meters) away.

The DIGI-STEM Thermometer is designed to meet the harsh demands of the process environment. The NEMA-4× stainless steel housing is waterproof and can withstand hose-down with caustic cleaning solutions. Immune to vibration and pulsation, the electronic sensor cannot be shaken out of calibration or broken from continuous stress. DIGI-STEMs are a direct replacement for bimetal, mercury, glass tube, or capillary instruments.

DIGI-STEM temperature ranges are available from 0°F up to 800°F (-20°C to 425°C) with stem lengths and process connections for virtually any application. Intrinsically safe, 3-A sanitary standard 09-09, and FM models are available.

DIGI-STEMs are available as self-powered thermometer units with up to 18-months battery life or as transmitter models offered with a 2-wire, 4-20 milliamp current loop.

Wahl Instruments, Inc., Asheville, NC

Reader Service No. 345

Rheometric Scientific Introduces New Rheometer for Elastomers and Rubber

Rheometric Scientific announced the release of a new rheometer designed specifically for testing elastomers and curing systems called the RDA-HT. Utilizing a unique high torque/ low compliance transducer and high torque servo motor, the RDA-HT is ideally suited for studying cure behavior, the effects of fillers, and end-use performance testing for the tire and rubber industry.

The RDA-HT comes with disposable plate fixtures in 8mm, 12.5mm, and 25 mm diameters so elastomers can be cured in the fixtures prior to testing, and an optional elastomer sample mold is also available. Using the torsion fixture, finished products from cured rubber to high strength composites can be tested at temperatures from -150°C up to 600°C.

Sean Kohl, director of sales for the Americas said, "For customers in the elastomer and rubber market, the RDA-HT fills a void in materials testing capability. For the first time, these customers will no longer have to choose between a precision rheometer and a cure meter or QC device such as an MDR/ODR or RPA."

The RDA3 is just one of a series of instruments from Rheometric Scientific designed for rubber and elastomer testing, ranging from the MiniMat Tensile Tester to the RSA3 high force DMA.

Rheometeric Scientific, Piscataway, NJ

Reader Service No. 346

Eriez Conveyor Systems Improve Metal Detection

Eriez E-Z Tec Conveyor Systems are designed to ensure optimal performance of the systems integral metal detection equipment. Improperly installing detectors or placing a metal detector on a poorly constructed conveyor will cause an end-user to experience false detections and reduced sensitivities. Each system includes an E-Z Tec Metal Detector, controls, a conveyor with a continuously welded stainless steel frame and articulated feet or casters.

Eriez custom designed metal detection conveyor systems are capable of detecting unwanted ferrous and non-ferrous material, and can be equipped with a variety of automatic reject devices. The majority of the units are furnished with Intraloxc or vulcanized PVC belts. Other belts are available upon request. The conveyors are used to move bulk or packaged material in a horizontal, inclined or curved direction.

"The demand for complete metal detection conveying systems continues to increase," said Jeff Kaveney, product manager, Eriez Magnetics, USA. By supplying a conveyor system with a metal detector, we can guarantee that the conveyor will not create any problems for the metal detector.

Eriez Magnetics, Erie, PA

Reader Service No. 347

How the Audiovisual Library Serves IAFP Members

Purpose ...

The Audiovisual Library offers International Association for Food Protection Members an educational service through a wide variety of quality training videos dealing with various food safety issues. This benefit allows Members free use of these videos.

How It Works ...

1) Members simply fill out an order form (see page 58) and fax or mail it to the IAFP office. Members may also find a Library listing and an order form online at the IAFP Web site at www.foodprotection.org.
2) Material from the Audiovisual Library is checked out for a maximum of two weeks (three weeks outside of North America) so that all Members can benefit from its use.
3) Requests are limited to five videos at a time.

How to Contribute to the Audiovisual Library ...

1) As the IAFP Membership continues to grow, so does the need for additional committee members and materials for the Library. The Audiovisual Committee meets at the IAFP Annual Meeting to discuss the status of the Audiovisual Library and ways to improve the service. New Members are sought to add fresh insight and ideas.
2) Donations of audiovisual materials are always needed and appreciated. Tapes in foreign languages (including, but not limited to Spanish, French, Chinese [Manderin/Cantonese]), are especially desired for International Members who wish to view tapes in their native language.
3) Members may also make a financial contribution to the Foundation Fund. The Foundation Fund sponsors worthy causes that enrich the Association. Revenue from the Foundation Fund supports the IAFP Audiovisual Library. Call Lisa Hovey, Assistant Director or Lucia Collison McPhedran, Association Services at 800.369.6337 or 515.276.3344 if you wish to make a donation.

Audiovisual Library

as of December 1, 2001

A Member Benefit of IAFP

DAIRY

D1180 **10 Points to Dairy Quality**–(10 minute videotape). Provides in-depth explanation of a critical control point in the residue prevention protocol. Illustrated with on-farm, packing plant, and milk-receiving plant scenes as well as interviews of producers, practicing veterinarians, regulatory officials and others. (Dairy Quality Assurance–1992) (Reviewed 1998)

D1010 **The Bulk Milk Hauler: Protocol & Procedures**–(8 minute videotape). Teaches bulk milk haulers how they contribute to quality milk production. Special emphasis is given to the hauler's role in proper milk sampling, sample care procedures, and understanding test results. (Iowa State University Extension–1990). (Reviewed 1998)

D1030 **Cold Hard Facts**–This video is recommended for training personnel associated with processing, transporting, warehousing, wholesaling and retailing frozen foods. It contains pertinent information related to good management practices necessary to ensure high quality frozen foods. (National Frozen Food Association–1993) (Reviewed 1998)

D1040 **Ether Extraction Method for Determination of Raw Milk**–(26 minute videotape). Describes the ether extraction procedure to measure milkfat in dairy products. Included is an explanation of the chemical reagents used in each step of the process. (CA–1988) (Reviewed 1998)

D1050 **The Farm Bulk Milk Hauler**–(30 minute–135 slides–tape–script). This slide set covers the complete procedure for sampling and collecting milk from farms. Each step is shown as it starts with the hauler entering the farm lane and ends when he leaves the milk house. Emphasis is on universal sampling and automated testing. Funds to develop this set were provided by The Federal Order #36 Milk Market Administrator. (Penn State–1982) (Reviewed 1998)

D1060 **Frozen Dairy Products**–(27 minute videotape). Developed by the California Department of Food and Agriculture. Although it mentions the importance of frozen desserts, safety and checking ingredients; emphasis is on what to look for in a plant inspection. Everything from receiving, through processing and cleaning and sanitizing is outlined, concluded with a quality control program. Directed to plant workers and supervisors, it shows you what should be done. (CA–1987) (Reviewed 1997)

D1070 **The Gerber Butterfat Test**–(7 minute videotape). Describes the Gerber milkfat test procedure for dairy products and compares it to the Babcock test procedure. (CA–1990) (Reviewed 1998)

D1080 **High-Temperature, Short-Time Pasteurizer**–(59 minute videotape). Provided by the Dairy Division of Borden, Inc. It was developed to train pasteurizer operators and is well done. There are seven sections with the first covering the twelve components of a pasteurizer and the purpose and operation of each. The tape provides the opportunity for discussion after each section or continuous running of the videotape. Flow diagrams, processing and cleaning are covered. (Borden, Inc.–1986) (Reviewed 1997)

D1090 **Managing Milking Quality**–(33 minute videotape). This training video is designed to help dairy farmers develop a quality management process and is consistent with ISO 9000 certification and HACCP processes. The first step is to evaluate the strengths and weaknesses of a dairy operation. The video will help you find ways to improve the weaknesses that are identified on your farm.

D1100 **Mastitis Prevention and Control**–(2-45 minute videotapes). This video is ideal for one-on-one or small group presentations. Section titles include: Mastitis Pathogens, Host Defense, Monitoring Mastitis, Mastitis Therapy, Recommended Milking Procedures, Postmilking Teat Dip Protocols, Milk Quality, Milking Systems. (Nasco–1993)

D1110 **Milk Plant Sanitation: Chemical Solution**–(13 minute videotape). This explains the proper procedure required of laboratory or plant personnel when performing chemical titration in a dairy plant. Five major titrations are reviewed... alkaline wash, presence of chlorine and iodophor, and caustic wash and an acid wash in a HTST system. Emphasis is also placed on record keeping and employee safety. (1989)

D1120 **Milk Processing Plant Inspection Procedures**–(15 minute videotape). Developed by the California Department of Food and Agriculture. It covers pre- and post-inspection meeting with management, but emphasis is on inspection of all manual and cleaned in place equipment in the receiving, processing and filling rooms. CIP systems are checked along with recording charts and employee locker and restrooms. Recommended for showing to plant workers and supervisors. (CA–1986)

D1130 **Pasteurizer – Design and Regulation**–(16 minute videotape). This tape provides a summary of the public health reasons for pasteurization and a nonlegal definition of pasteurization. The components of an HTST pasteurizer, elements of design, flow-through diagram and legal controls are discussed. (Kraft General Foods–1990) (Reviewed 1998)

D1140 **Pasteurizer – Operation**–(11 minute videotape). This tape provides a summary of the operation of an HTST pasteurizer from start-up with hot water sanitization to product pasteurization and shut-down. There is an emphasis on the legal documentation required. (Kraft General Foods–1990) (Reviewed 1998)

D1150 **Processing Fluid Milk**–(30 minute–140 slides–script–tape). This slide set was developed to train processing plant personnel on preventing food poisoning and spoilage bacteria in fluid dairy products. Emphasis is on processing procedures to meet federal regulations and standards. Processing procedures, pasteurization times and temperatures, purposes of equipment, composition standards, and cleaning and sanitizing are covered. Primary emphasis is on facilities such as drains and floors, and filling equipment to prevent post-pasteurization contamination with spoilage or food poisoning bacteria. It was reviewed by many industry plant operators and regulatory agents and is directed to plant workers and management. (Penn State–1987) (Reviewed 1998)

ENVIRONMENTAL

E3010 **The ABCs of Clean–A Handwashing & Cleanliness Program for Early Childhood Programs**–For early childhood program employees. This tape illustrates how proper handwashing and clean hands can contribute to the infection control program in daycare centers and other early childhood programs. (The Soap & Detergent Association–1991)

E3020 **Acceptable Risks?**–(16 minute videotape). Accidents, deliberate misinformation, and the rapid proliferation of nuclear power plants have created increased fears of improper nuclear waste disposal, accidents during the transportation of waste, and the release of radioactive effluents from plants. The program shows the occurrence of statistically anomalous leukemia clusters; governmental testing of marine organisms and how they absorb radiation; charts the kinds and amounts of natural and man-made radiation to which man is subject; and suggests there is no easy solution to balancing our fears to nuclear power and our need for it. (Films for the Humanities & Sciences, Inc.–1993) (Reviewed 1998)

E3030 **Air Pollution: Indoor**–(26 minute videotape). Indoor air pollution is in many ways a self-induced problem...which makes it no easier to solve. Painting and other home improvements have introduced pollutants, thermal insulation and other energy-saving and water-proofing devices have trapped the pollutants inside. The result is that air pollution inside a modern home can be worse than inside a chemical plant. (Films for the Humanities & Sciences, Inc.) (Reviewed 1998)

E3040 **Asbestos Awareness**–(20 minute videotape). This videotape discusses the major types of asbestos and their current and past uses. Emphasis is given to the health risks associated with asbestos exposure and approved asbestos removal abatement techniques. (Industrial Training, Inc.–1988) (Reviewed 1998)

E3055 **Effective Handwashing–Preventing Cross-Contamination in the Food Service Industry**–(3 1/2 minute videotape). It is critical that all food service workers wash their hands often and correctly. This video discusses the double wash method and the single wash method and when to use each method. (Zep Manufacturing Company–1993)

E3060 **EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Ceriodaphnia)**–(22 minute videotape). Demonstrates the Ceriodaphnia 7-Day Survival and Reproduction Toxicity Test and how it is used to monitor and evaluate effluents for their toxicity to biota and their impact on receiving waters and the establishment of NPDES permit limitations for toxicity. The tape covers the general procedures for the test including how it is set up, started, monitored, renewed and terminated. (1989) (Reviewed 1998)

E3070 **EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Fathead Minnow Larva)**–(15 minute videotape). A training tape that teaches environmental professionals about the Fathead Minnow Larval Survival and Growth Toxicity Test. The method described is found in an EPA document entitled, "Short Term Methods for Estimating the Chronic Toxicity of Effluents & Receiving Waters to Freshwater Organisms." The tape demonstrates how fathead minnow toxicity tests can be used to monitor and evaluate effluents for their toxicity to biota and their impact on receiving waters and the establishment of NPDES permit limitations for toxicity. (1989) (Reviewed 1998)

E3075 **EPA: This is Super Fund**–(12 minute videotape). Produced by the United States Environmental Protection Agency (EPA) in Washington, D.C., this videotape focuses on reporting and handling hazardous waste sites in our environment. The agency emphasizes community involvement in identifying chemical waste sites and reporting contaminated areas to the authorities. The primary goal of the "Super Fund Site Process" is to protect human health and to prevent and eliminate hazardous chemicals in communities. The film outlines how to identify and report abandoned waste sites and how communities can participate in the process of

cleaning up hazardous sites. The program also explains how federal, state and local governments, industry and residents can work together to develop and implement local emergency preparedness/response plans in case chemical waste is discovered in a community.

E3080 **Fit to Drink**–(20 minute videotape). This program traces the water cycle, beginning with the collection of rain-water in rivers and lakes, in great detail through a water treatment plant, to some of the places where water is used, and finally back into the atmosphere. Treatment of the water begins with the use of chlorine to destroy organisms; the water is then filtered through various sedimentation tanks to remove solid matter. Other treatments employ ozone, which oxidizes contaminants and makes them easier to remove; hydrated lime, which reduces the acidity of the water; sulfur dioxide, which removes any excess chlorine; and floculation, a process in which aluminum sulfate causes small particles to clump together and precipitate out. Throughout various stages of purification, the water is continuously tested for smell, taste, titration, and by fish. The treatment plant also monitors less common contaminants with the use of up-to-date techniques like flame spectrometers and gas liquefaction. (Films for the Humanities & Sciences, Inc.–1987)

E3110 **Garbage: The Movie**–(25 minute videotape). A fascinating look at the solid waste problem and its impact on the environment. Viewers are introduced to landfills, incinerators, recycling plants and composting operations as solid waste management solutions. Problems associated with modern landfills are identified and low-impact alternatives such as recycling, reuse, and source reduction are examined. (Churchill Films) (Reviewed 1998)

E3120 **Global Warming: Hot Times Ahead**–(23 minute videotape). An informative videotape program that explores the global warming phenomenon and some of the devastating changes it may cause. This program identifies greenhouse gases and how they are produced by human activities. Considered are: energy use in transportation, industry and home; effects of deforestation, planting of trees and recycling as means of slowing the build-up of greenhouse gases. (Churchill Films–1995)

E3130 **Kentucky Public Swimming Pool & Bathing Facilities**–(38 minute videotape). Developed by the Lincoln Trail District Health Department in Kentucky and includes all of their state regulations which may be different from other states, provinces and countries. This tape can be used to train those responsible for operating pools and waterfront bath facilities. All aspects are included of which we are aware, including checking water conditions and filtration methods. (1987). (Reviewed 1998)

E3135 **Plastics Recycling Today: A Growing Resource**–(11:35 minute videotape). Recycling is a growing segment of our nation's solid waste management program. This video shows how plastics are handled from curbside pickup through the recycling process to end-use by consumers. This video provides a basic understanding of recycling programs and how communities, companies and others can benefit from recycling. (The Society of the Plastics Industry, Inc.–1988)

E3140 **Putting Aside Pesticides**–(26 minute videotape). This program probes the long-term effects of pesticides and explores alternative pest-control efforts; biological pesticides, genetically-engineered microbes that kill objectionable insects, the use of natural insect predators, and the cross-breeding and genetic engineering of new plant strains that produce their own anti-pest toxins. (Films for the Humanities & Sciences, Inc.) (Reviewed 1999)

E3150 **Radon**–(26 minute videotape). This program looks at the possible health implications of radon pollution, methods home-owners can use to detect radon gas in their homes, and what can be done to minimize hazards once they are found.

E3160 **RCRA–Hazardous Waste**–(19 minute videotape). This videotape explains the dangers associated with hazardous chemical handling and discusses the major hazardous waste handling requirements presented in the Resource Conservation and Recovery Act. (Industrial Training, Inc.)

The New Superfund. What It is & How It Works–A six-hour national video conference sponsored by the EPA. Target audiences include the general public, private industry, emergency responders and public interest groups. The series features six videotapes that review and highlight the following issues:

E3170 **Tape 1–Changes in the Remedial Process: Clean-up Standards and State Involvement Requirements**–(62 minute videotape). A general overview of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and the challenge of its implementation. The remedy process – long-term and permanent clean-up is illustrated step-by-step, with emphasis on the new mandatory clean-up schedules, preliminary site assessment petition procedures and the hazard ranking system/National Priority List revisions. The major role of state and local government involvement and responsibility is stressed.

E3180 **Tape 2–Changes in the Removal Process: Removal and Additional Program Requirements**–(48 minute videotape). The removal process is a short-term action and usually an immediate response to accidents, fires and illegal dumped hazardous substances. This program explains the changes that expand removal author-

ity and require procedures consistent with the goals of remedial action.

E3190 **Tape 3–Enforcement & Federal Facilities**–(52 minute videotape). Who is responsible for SARA clean-up costs? Principles of responsible party liability; the difference between strict, joint and several liability; and the issue of the innocent land owner are discussed. Superfund enforcement tools-mixed funding, De Minimis settlements and the new nonbinding preliminary allocations of responsibility (NBARs) are explained.

E3210 **Tape 4–Emergency Preparedness & Community Right-to-Know**–(48 minute videotape). A major part of SARA is a free-standing act known as Title III: The Emergency Planning and Community Right-to-Know Act of 1986, requiring federal, state, and local governments and industry to work together in developing local emergency preparedness/response plans. This program discusses local emergency planning committee requirements, emergency notification procedures, and specifications on community right-to-know reporting requirements such as using OSHA Material Safety Data Sheets, the emergency & hazardous chemical inventory and the toxic chemical release inventory.

E3220 **Tape 5–Underground Storage Tank Trust Fund & Response Program**–(21 minute videotape). Another addition to SARA is the Leaking Underground Storage Tank (LUST) Trust Fund. One half of the US population depends on ground water for drinking–and EPA estimates that as many as 200,000 underground storage tanks are corroding and leaking into our ground water. This program discusses how the LUST Trust Fund will be used by EPA and the states in responding quickly to contain and clean-up LUST releases. Also covered is state enforcement and action requirements, and owner/operator responsibility.

E3230 **Tape 6–Research & Development/ Closing Remarks**–(33 minute videotape). An important new mandate of the new Superfund is the technical provisions for research and development to create more permanent methods in handling and disposing of hazardous wastes and managing hazardous substances. This segment discusses the SITE (Superfund Innovative Technology Evaluation) program, the University Hazardous Substance Research Centers, hazardous substance health research and the DOD research, development and demonstration management of DOD wastes.

E3240 **Sink A Germ**–(10 minute videotape). A presentation on the rationale and techniques for effective handwashing in health care institutions. Uses strong imagery to educate hospital personnel that handwashing is the single most important means of preventing the spread of infection. (The Brevis Corp.–1986). (Reviewed 1998)

E3245 **Wash Your Hands**–(5 minute videotape). Handwashing is the single most important means of preventing the spread of infection. This video presents why handwashing is important and the correct way to wash your hands. (LWB Company–1995)

E3250 **Waste Not: Reducing Hazardous Waste**–(35 minute videotape). This tape looks at the progress and promise of efforts to reduce the generation of hazardous waste at the source. In a series of company profiles, it shows activities and programs within industry to minimize hazardous waste in the production process. Waste Not also looks at the obstacles to waste reduction, both within and outside of industry, and considers how society might further encourage the adoption of pollution prevention, rather than pollution control, as the primary approach to the problems posed by hazardous waste. (Umbrella films)

FOOD

F2260 **100 Degrees of Doom... The Time & Temperature Caper**–(14 minute videotape). Video portraying a private eye tracking down the cause of a *Salmonella* poisoning. Temperature control is emphasized as a key factor in preventing foodborne illness. (Educational Communications, Inc.–1987) (Reviewed 1998)

F2450 **A Guide to Making Safe Smoked Fish**–(21 minute videotape). Smoked fish can be a profitable product for aquaculturalists, but it can be lethal if not done correctly. This video guides you through the steps necessary to make safe smoked fish. It provides directions for brining, smoking, cooling, packaging and labeling, and cold storage to ensure safety. The video features footage of fish smoking being done using both traditional and modern equipment. (University of Wisconsin-Madison–Spring, 1999)

F2005 **A Lot on the Line**–(25 minute videotape). Through a riveting dramatization, "A Lot on the Line" is a powerful training tool for food manufacturing and food service employees. In the video, a food plant supervisor and his pregnant wife are eagerly awaiting the birth of their first child. Across town, a deli manager is taking his wife and young daughter away for a relaxing weekend. Both families, in a devastating twist of

fate, will experience the pain, fear, and disruption caused by foodborne illness. This emotionally charged video will enthrall new and old employees alike and strongly reinforce the importance of incorporating GMPs into everyday work routines. Without question, "A Lot on the Line" will become an indispensable part of your company's training efforts. (Silliker Laboratories–2000)

F2440 **Cleaning & Sanitizing in Vegetable Processing Plants: Do It Well, Do It Safely!–** (16 minute videotape) This training video shows how to safely and effectively clean and sanitize in a vegetable processing plant. It teaches how it is the same for processing plant as it is for washing dishes at home. (University of Wisconsin Extension–1996) (Available in Spanish)

F2010 **Close Encounters of the Bird Kind–**(18 minute videotape). A humorous but in-depth look at *Salmonella* bacteria, their sources, and their role in foodborne disease. A modern poultry processing plant is visited, and the primary processing steps and equipment are examined. Potential sources of *Salmonella* contamination are identified at the different stages of production along with the control techniques that are employed to insure safe poultry products. (Topek Products, Inc.) (Reviewed 1998)

F2015 **Controlling *Listeria*: A Team Approach–**(16 minute videotape). In this video, a small food company voluntarily shuts down following the implication of one of its products in devastating outbreak of *Listeria monocytogenes*. This recall dramatization is followed by actual in-plant footage highlighted key practices in controlling *Listeria*. This video provides workers with an overview of the organism, as well as practical steps that can be taken to control its growth in plant environments. Finally, the video leaves plant personnel with a powerful, resounding message: Teamwork and commitment are crucial in the production of safe, quality foods. (Silliker Laboratories–2000)

F2037 **Cooking and Cooling of Meat and Poultry Products–**(2 videotapes – 176 minutes). (See Part 1 Tape F2035 and Part 2 Tape F2036). This is session 3 of a 3-part Meat and Poultry Teleconference cosponsored by AFDO and the USDA Food Safety Inspection Service. Upon completion of viewing these videotapes, the viewer will be able to (1) recognize inadequate processes associated with the cooking and cooling of meat and poultry at the retail level; (2) Discuss the hazards associated with foods and the cooking and cooling processes with management at the retail level; (3) Determine the adequacy of control methods to prevent microbiological hazards in cooking and cooling at the retail level, and (4) Understand the principle for determining temperature with various temperature measuring devices. (AFDO/USDA–1999)

F2030 **"Egg Games" Foodservice Egg Handling and Safety–**(18 minute videotape). Develop an effective egg handling and safety program that is right for your operation. Ideal for manager training and foodservice educational programs, this video provides step-by-step information in an entertaining, visually-exciting format. (American Egg Board–1999)

F2020 **Egg Handling & Safety–**(11 minute videotape). Provides basic guidelines for handling fresh eggs which could be useful in training regulatory and industry personnel. (American Egg Board–1997)

F2036 **Emerging Pathogens and Grinding and Cooking Comminuted Beef–**(2 videotapes – 165 minutes.) (See Part 1 Tape F2035 and Part 3 Tape F2037.) This is session 2 of a 3-part Meat and Poultry Teleconference co-sponsored by AFDO and the USDA Food Safety Inspection Service. These videotapes present an action plan for federal, state, local authorities, industry, and trade associations in a foodborne outbreak. (AFDO/USDA–1998)

F2035 **Fabrication and Curing of Meat and Poultry Products–**(2 videotapes – 145 minutes). (See Part 2 Tape F2036 and Part 3 Tape F2037). This is session 1 of a 3-part Meat and Poultry Teleconference cosponsored by AFDO and the USDA Food Safety Inspection Service. Upon viewing, the sanitarian will be able to (1) Identify typical equipment used for meat and poultry fabrication at retail and understand their uses; (2) Define specific terms used in fabrication of meat and poultry products in retail establishments, and (3) Identify specific food safety hazards associated with fabrication and their controls. (AFDO/USDA–1997)

F2039 **Food for Thought–The GMP Quiz Show–**(16 minute videotape). In the grand tradition of television quiz shows, three food industry workers test their knowledge of GMP principles. As the contestants jockey to answer questions, the video provides a thorough and timely review of GMP principles. This video is a cost-effective tool to train new hires or sharpen the knowledge of veteran employees. Topics covered include employee practices, including proper attire, contamination, stock rotation, pest control, conditions for microbial growth and employee traffic patterns. Food safety terms such as HACCP, microbial growth niche, temperature danger zone, FIFO and cross-contamination, are also defined. (Silliker Laboratories–2000)

F2040 **Food Irradiation–**(30 minute videotape). Introduces viewers to food irradiation as a new preservation technique. Illustrates how food irradiation can be used to prevent spoilage by microorganisms, destruction by insects, overripening, and to reduce the need for chemical food additives. The food irradiation process is explained and benefits of the process are highlighted. (Turnelle Productions, Inc.) (Reviewed 1998)

F2045 **Food Microbiological Control–**(6-videotapes – approximate time 12 hours). Designed to provide information and demonstrate the application of basic microbiology, the Good Manufacturing Prac-

tices (GMPs), retail Food Code, and sanitation practices when conducting food inspections at the processing and retail levels. Viewers will enhance their ability to identify potential food hazards and evaluate the adequacy of proper control methods for these hazards. (FDA-1998)

F2050 **Food Safe-Food Smart-HACCP & Its Application to the Food Industry**-(2-16 minute videotapes). (1)-Introduces the seven principles of HACCP and their application to the food industry. Viewers will learn about the HACCP system and how it is used in the food industry to provide a safe food supply. (2)-Provides guidance on how to design and implement a HACCP system. It is intended for individuals with the responsibility of setting up a HACCP system. (Alberta Agriculture, Food and Rural Development) (Reviewed 1998)

F2060 **Food Safe-Series I**-(4-10 minute videotapes). (1) "Receiving & Storing Food Safely," details for food-service workers the procedures for performing sight inspections for the general conditions of food, including a discussion of food labeling and government approval stamps. (2) "Food-service Facilities and Equipment," outlines the requirements for the proper cleaning and sanitizing of equipment used in food preparation areas. Describes the type of materials, design, and proper maintenance of this equipment. (3) "Microbiology for Foodservice Workers," provides a basic understanding of the microorganisms which cause food spoilage and foodborne illness. This program describes bacteria, viruses, protozoa, and parasites and the conditions which support their growth. (4) "Food-service Housekeeping and Pest Control," emphasizes cleanliness as the basis for all pest control. Viewers learn the habits and life cycles of flies, cockroaches, rats, and mice. (Perennial Education-1991) (Reviewed 1998)

F2070 **Food Safe-Series II**-(4-10 minute videotapes). Presents case histories of foodborne disease involving (1) *Staphylococcus aureus,* (sauces) (2) *Salmonella,* (eggs) (3) *Campylobacter,* and (4) *Clostridium botulinum.* Each tape demonstrates errors in preparation, holding or serving food; describes the consequences of those actions; reviews the procedures to reveal the cause of the illness; and illustrates the correct practices in a step-by-step demonstration. These are excellent tapes to use in conjunction with hazard analysis critical control point training programs. (Perennial Education-1991) (Reviewed 1998)

F2080 **Food Safe-Series III**-(4-10 minute videotapes). More case histories of foodborne disease. This set includes (1) Hepatitis "A", (2) *Staphylococcus aureus* (meats), (3) *Bacillus cereus*, and (4) *Salmonella* (meat). Viewers will learn typical errors in the preparation, holding and serving of food. Also included are examples of correct procedures which will reduce the risk of food contamination. (Perennial Education-1991) (Reviewed 1998)

F2133 **Food Safety First**-(50 minute videotape). This food safety training video presents causes of foodborne illness in foodservice and ways to prevent foodborne illness. Individual segments include personal hygiene and handwashing, cleaning and sanitizing, preventing cross contamination and avoiding time and temperature abuse. Foodhandling principles are presented through scenarios in a restaurant kitchen. (Glo-Germ 1998). Available in Spanish.

F2090 **Food Safety: An Educational Video for Institutional Food-Service Workers**-(10 minute videotape). Provides a general discussion on food safety principles with special emphasis on pathogen reductions in an institutional setting from child care centers to nursing homes. (US Department of Health & Human Services-1997)

Food Safety for Foodservice-An employee video series containing quick, 10-minute videos that teach food service employees how to prevent foodborne illness. This four video series examines sources of foodborne illness, plus explores prevention through awareness and recommendations for best practices for food safety. It also looks at how food safety affects the food service employee's job. (J.J. Keller & Associates-2000)

F2100 **Tape 1-Food Safety for Food Service: Cross Contamination** - (10 minute videotape). Provides the basic information needed to ensure integrity and safety in foodservice operations. Explains proper practices and procedures to prevent, detect and eliminate cross contamination.

F2101 **Tape 2-Food Safety for Food Service: HACCP** - (10 minute videotape). This video takes the mystery out of HACCP for your employees, and explains the importance of HACCP procedures in their work. Employees will come away feeling confident, knowing how to make HACCP work. The seven steps of HACCP and how HACCP is used in foodservice are some of the topics discussed.

F2102 **Tape 3-Food Safety for Food Service: Personal Hygiene**-(10 minute videotape). This video establishes clear, understandable ground rules for good personal hygiene in the foodservice workplace and explains why personal hygiene is so important. Topics include: personal cleanliness; proper protective equipment; correct hand washing procedures; when to wash hands, hygiene with respect to cross contamination and prohibited practices and habits.

F2103 **Tape 4-Food Safety for Food Service: Time and Temperature Controls**-(10 minute videotape). This video examines storage and handling of raw and cooked ingredients, and explains how to ensure their safety. Employees learn how to spot potential problems

and what to do when they find them. Topics include: correct thermometer use, cooling, thawing and heating procedures, food storage procedures, holding temperature requirements, and handling leftovers.

F2120 **Food Safety: For Goodness Sake, Keep Food Safe**–(15 minute videotape). Teaches foodhandlers the fundamentals of safe food handling. The tape features the key elements of cleanliness and sanitation, including: good personal hygiene, maintaining proper food product temperature, preventing time abuse, and potential sources of food contamination. (Iowa State University Extension–1990) (Reviewed 1998)

F2110 **Food Safety is No Mystery**–(34 minute videotape). This is an excellent training visual for food-service workers. It shows the proper ways to prepare, handle, serve and store food in actual restaurant, school and hospital situations. A policeman sick from food poisoning, a health department sanitarian, and a food-service worker with all the bad habits are featured. The latest recommendations on personal hygiene, temperatures, cross-contamination, and storage of foods are included. (USDA–1987). Also available in Spanish. – (Reviewed 1998)

F2130 **Food Safety: You Make the Difference**–(28 minute videotape). Through five food workers from differing backgrounds, this engaging and inspirational documentary style video illustrates the four basic food safety concepts: handwashing, preventing cross-contamination, moving foods quickly through the danger zone, and hot/cold holding (Seattle-King County Health Department–1995)

Food Safety Zone Video Series–A one-of-a-kind series that helps get your employees to take food safety issues seriously! These short, to-the-point videos can help make your employees aware of various food hazards, and how they can help promote food safety. The 4 topics are: Basic Microbiology, Cross Contamination, Personal Hygiene, and Sanitation. (J.J. Keller & Associates – 1999). (Also available in Spanish.)

F2125 **Tape 1–Food Safety Zone: Basic Microbiology**–(10 minute videotape). In this video, food service personnel will gain a deeper understanding of food safety issues and what they can do to prevent recalls and contamination. It describes the different types of bacteria that can be harmful to food, and tells how to minimize bacterial growth through time and temperature controls, personal hygiene practices, and sanitation.

F2126 **Tape 2–Food Safety Zone: Cross Contamination**–(10 minute videotape). Quickly teach your employees how they can help prevent cross contamination. Employees are educated on why contaminants can be extremely dangerous, cause serious injury, and even death, to consumers of their food products. This fast-paced video will give your employees a deeper understanding of the different types of cross contamination, how to prevent it, and how to detect it through visual inspections and equipment. The emphasis is that prevention is the key to eliminating cross contamination.

F2127 **Tape 3–Food Safety Zone: Personal Hygiene**–(10 minute videotape). After watching this video, your employees will understand why their personal hygiene is critical to the success of your business. This video teaches employees about four basic good personal hygiene practices: keeping themselves clean, wearing clean clothes, following specific hand washing procedures, and complying with all related work practices. Personnel are also taught that personal hygiene practices are designed to prevent them from accidentally introducing bacteria to food products, and are so important that there are federal laws that all food handlers must obey.

F2128 **Tape 4–Food Safety Zone: Sanitation** –(10 minute videotape). Don't just tell your employees why sanitation is important, show them! This training video teaches employees about the sanitation procedures that cover all practices to keep workplaces clean, and food produced free of contaminants and harmful bacteria. Four areas covered include personal hygiene, equipment and work areas, use and storage of cleaning chemicals and equipment, and pest control.

F2135 **Get with a Safe Food Attitude**–(40 minute videotape). Consisting of nine short segments which can be viewed individually or as a group, this video presents safe food handling for moms-to-be. Any illness a pregnant woman contracts can affect her unborn child whose immune system is too immature to fight back. The video follows four pregnant women as they learn about food safety and preventing foodborne illness. (US Department of Agriculture–1999)

F2137 **GMP Basics: Avoiding Microbial Cross-Contamination**–(15 minute videotape). This video takes a closer look at how harmful microorganisms, such as *Listeria*, can be transferred to finished products. Employees see numerous examples of how microbial cross-contamination can occur from improper traffic patterns, poor personal hygiene, soiled clothing, unsanitized tools and equipment. Employees need specific knowledge and practical training to avoid microbial cross-contamination in plants. This video aids in that training. (Silliker Laboratories–2000)

F2140 **GMP Basics – Employee Hygiene Practices**–(20 minute videotape). Through real-life examples and dramatization, this video demonstrates good manufacturing practices that relate to employee hygiene, particularly hand washing. This video includes a unique test section to help assess participants' understanding of common GMP violations. (Silliker Laboratories–1997)

F2143 **GMP Basics: Guidelines for Maintenance Personnel**–(21 minute videotape). Developed specifically for maintenance personnel working in a food processing environment, this video depicts a plant-wide training initiative following a product recall announcement. Maintenance personnel will learn how GMPs relate to their daily activities and how important their roles are in the production of safe food products. (Silliker Laboratories–1999)

F2148 **GMP–GSP Employee**–(38 minute videotape). This video was developed to teach food plant employees the importance of "Good Manufacturing Practices" and "Good Sanitation Practices." Law dictates that food must be clean and safe to eat. This video emphasizes the significance of each employee's role in protecting food against contamination. Tips on personal cleanliness and hygiene are also presented. (L.J. Bianco & Associates)

F2150 **GMP: Personal Hygiene & Practices in Food Manufacturing**–(14 minute videotape). This video focuses on the personal hygiene of food-manufacturing workers, and explores how poor hygiene habits can be responsible for the contamination of food in the manufacturing process. This is an instructional tool for new food-manufacturing line employees and supervisors. It was produced with "real" people in actual plant situations, with only one line of text included in the videotape. (Penn State–1993)– (Available in Spanish and Vietnamese)

F2147 **GMP Basics: Process Control Practices**–(16 minute videotape). In actual food processing environments, an on-camera host takes employees through a typical food plant as they learn the importance of monitoring and controlling key points in the manufacturing process. Beginning with receiving and storing, through production, and ending with packaging and distribution, control measures are introduced, demonstrated, and reviewed. Employees will see how their everyday activities in the plant have an impact on product safety. (Silliker Laboratories–1999)

F2160 **GMP: Sources & Control of Contamination during Processing**–(20 minute videotape). This program, designed as an instructional tool for new employees and for refresher training for current or reassigned workers, focuses on the sources and control of contamination in the food-manufacturing process. It was produced in actual food plant situations. A concise description of microbial contamination and growth and cross-contamination, a demonstration of food storage, and a review of aerosol contaminants are also included. (Penn State–1995)

F2180 **HACCP: Safe Food Handling Techniques**–(22 minute videotape). The video highlights the primary causes of food poisoning and emphasizes the importance of self-inspection. An explanation of potentially hazardous foods, cross-contamination, and temperature control is provided. The main focus is a detailed description of how to implement a Hazard Analysis Critical Control Point (HACCP) program in a food-service operation. A leader's guide is provided as an adjunct to the tape. (The Canadian Restaurant & Foodservices Association–1990) (Reviewed 1998)

F2169 **HACCP: Training for Employees — USDA Awareness**–(15 minute videotape). This video is a detailed training outline provided for the employee program. Included in the video is a synopsis of general federal regulations; HACCP plan development; incorporation of HACCP's seven principles; HACCP plan checklist, and an HACCP employee training program. (J.J. Keller & Associates—1999)

F2172 **HACCP: Training for Managers**–(17 minute videotape). Through industry-specific examples and case studies, this video addresses the seven HACCP steps, identifying critical control points, recordkeeping and documentation, auditing, and monitoring. It also explains how HACCP relates to other programs such as Good Manufacturing Practices and plant sanitation. (J.J. Keller & Associates, Inc.–2000)

F2170 **The Heart of HACCP**–(22 minute videotape). A training video designed to give plant personnel a clear understanding of the seven HACCP principles and practical guidance on how to apply these principles to their own work environment. This video emphasizes the principles of primary concern to plant personnel such as critical limits, monitoring systems, and corrective actions that are vital to the success of a HACCP plan. (Silliker Laboratories Group–1994)

F2171 **HACCP: The Way to Food Safety**–(53 minute videotape). The video highlights the primary causes of food poisoning and stresses the importance of self-inspection. Potentially hazardous foods, cross-contamination and temperature control are explained. The video is designed to give a clear understanding of the seven HACCP principles and practical guidance on how to apply these principles to a work environment. Critical limits, monitoring systems and corrective action plans are emphasized. The video also provides an overview of foodborne pathogens, covering terminology, the impact of pathogens, and what employees must do to avoid problems. Also described are the sources, causes and dangers of contamination in the food industry. (Southern Illinois University–1997)

F2175 **Inspecting For Food Safety–Kentucky's Food Code**–(100 minute videotape). Kentucky's Food Code is patterned after the Federal Food Code. The concepts, definitions, procedures, and regulatory standards included

in the code are based on the most current information about how to prevent foodborne diseases. This video is designed to prepare food safety inspectors to effectively use the new food code in the performance of their duties. (Department of Public Health Commonwealth of Kentucky–1997) (Reviewed 1999)

F2190 **Is What You Order What You Get? Seafood Integrity**–(18 minute videotape). Teaches seafood department employees about seafood safety and how they can help insure the integrity of seafood sold by retail food markets. Key points of interest are cross-contamination control, methods and criteria for receiving seafood and determining product quality, and knowing how to identify fish and seafood when unapproved substitutions have been made. (The Food Marketing Institute) (Reviewed 1998)

F2210 **Northern Delight–From Canada to the World**–(13 minute videotape). A promotional video that explores the wide variety of foods and beverages produced by the Canadian food industry. General in nature, this tape presents an overview of Canada's food industry and its contribution to the world's food supply. (Ternelle Production, Ltd.) (Reviewed 1998)

F2240 **On the Front Line**–(18 minute videotape). A training video pertaining to sanitation fundamentals for vending service personnel. Standard cleaning and serving procedures for cold food, hot beverage and cup drink vending machines are presented. The video emphasizes specific cleaning and serving practices which are important to food and beverage vending operations. (National Automatic Merchandising Association–1993) (Reviewed 1998)

F2250 **On the Line**–(30 minute videotape). This was developed by the Food Processors Institute for training food processing plant employees. It creates an awareness of quality control and regulations. Emphasis is on personal hygiene, equipment cleanliness and good housekeeping in a food plant. It is recommended for showing to both new and experienced workers. (Available in Spanish) The Food Processors Institute. 1993. (Reviewed 1998)

F2270 **Pest Control in Seafood Processing Plants**–(26 minute videotape). Videotape which covers procedures to control flies, roaches, mice, rats and other common pests associated with food processing operations. The tape will familiarize plant personnel with the basic characteristics of these pests and the potential hazards associated with their presence in food operations. (Reviewed 1998)

F2280 **Principles of Warehouse Sanitation**–(33 minute videotape). This videotape gives a clear, concise and complete illustration of the principles set down in the Food, Drug and Cosmetic Act and in the Good Manufacturing Practices, as well as supporting legislation by individual states. (American Institute of Baking–1993)

F2290 **Product Safety & Shelf Life**–(40 minute videotape). Developed by Borden Inc., this videotape was done in three sections with opportunity for review. Emphasis is on providing consumers with good products. One section covers off-flavors, another product problems caused by plant conditions, and a third the need to keep products cold and fresh. Procedures to assure this are outlined, as shown in a plant. Well done and directed to plant workers and supervisors. (Borden–1987) – (Reviewed 1997)

F2220 **Proper Handling of Peracidic Acid**–(15 minute videotape). Introduces paracidic acid as a chemical sanitizer and features the various precautions needed to use the product safely in the food industry.

F2230 **Purely Coincidental**–(20 minute videotape). A parody that shows how foodborne illness can adversely affect the lives of families that are involved. The movie compares improper handling of dog food in a manufacturing plant that causes the death of a family pet with improper handling of human food in a manufacturing plant that causes a child to become ill. Both cases illustrate how handling errors in food production can produce devastating outcomes. (The Quaker Oats Company–1993.) (Reviewed 1998)

F2310 **Safe Food: You Can Make a Difference**–(25 minute videotape). A training video for food-service workers which covers the fundamentals of food safety. An explanation of proper food temperature, food storage, cross-contamination control, cleaning and sanitizing, and handwashing as methods of foodborne illness control is provided. The video provides an orientation to food safety for professional foodhandlers. (Tacoma–Pierce County Health Department–1990). (Reviewed 1998)

F2320 **Safe Handwashing**–(15 minute videotape). Twenty-five percent of all foodborne illnesses are traced to improper handwashing. The problem is not just that handwashing is not done, the problem is that it's not done properly. This training video demonstrates the "double wash" technique developed by Dr. O. Peter Snyder of the Hospitality Institute for Technology and Management. Dr. Snyder demonstrates the procedure while reinforcing the microbiological reasons for keeping hands clean. (Hospitality Institute for Technology and Management–1991) (Reviewed 1998)

F2325 **Safe Practices for Sausage Production**–(3 hour videotape). This videotape is based on a series of educational broadcasts on meat and poultry inspections at retail food establishments produced by the Association of Food and Drug Officials (AFDO) and USDA's Food Safety and Inspection Service (FSIS), along with FDA's Center for Food Safety and Applied Nutrition. The purpose of the broadcast was to provide training to state, local, and tribal sanitarians on processes and procedures that are being utilized by retail stores and restaurants, especially those

that were usually seen in USDA-inspected facilities. The program will cover the main production steps of sausage products, such as the processes of grinding, stuffing, and smoking, and typical equipment used will be depicted. Characteristics of different types of sausage (fresh, cooked and smoked, and dry/semi-dry) will be explained. Pathogens of concern and outbreaks associated with sausage will be discussed. The written manual for the program is available at www.fsis.usda.gov/ofo/hrds/STATE/RETAIL/manual.htm. (1999)

F2460 **Safer Processing of Sprouts**-(1 hour and 22 minute videotape). Sprouts are enjoyed by many consumers for their taste and nutritional value. However, recent outbreaks of illnesses associated with sprouts have demonstrated a potentially serious human health risk posed by this food. FDA and other public health officials are working with industry to identify and implement production practices that will assure that seed and sprouted seed are produced under safe conditions. This training video covers safe processing practices of sprouts including growing, harvesting, milling, transportation, storage, seed treatment, cleaning and sanitizing, sampling and microbiological testing. (CA Dept. of Health Services, Food and Drug Branch; U.S. Food and Drug Administration, and the Centers for Disease Control and Prevention - 2000)

F2330 **Sanitation for Seafood Processing Personnel**-(20 minute videotape). A training video suited for professional foodhandlers working in any type of food manufacturing plant. The film highlights Good Manufacturing Practices and their role in assuring food safety. The professional foodhandler is introduced to a variety of sanitation topics including: (1) foodhandlers as a source of food contamination, (2) personal hygiene as a means of preventing food contamination, (3) approved food storage techniques including safe storage temperatures, (4) sources of cross-contamination, (5) contamination of food by insects and rodents, (6) garbage handling and pest control, and (7) design and location of equipment and physical facilities to facilitate cleaning. (Reviewed 1998)

F2340 **Sanitizing for Safety**-(17 minute videotape). Provides an introduction to basic food safety for professional foodhandlers. A training pamphlet and quiz accompany the tape. Although produced by a chemical supplier, the tape contains minimal commercialism and may be a valuable tool for training new employees in the food industry. (Clorox-1990) (Reviewed 1998)

F2350 **ServSafe® Steps to Food Safety**-The ServSafe food safety series consists of six videos that illustrate and reinforce important food safety practices in an informative and entertaining manner. The videos provide realistic scenarios in multiple industry segments. English and Spanish are provided on each tape. (National Restaurant Association Education Foundation -2000)

Step One: Starting Out with Food Safety-(12 minute videotape). Defines what foodborne illness is and how it occurs; how foods become unsafe; and what safety practices to follow during the flow of food.

Step Two: Ensuring Proper Personal Hygiene-(10 minute videotape). Introduces employees to ways they might contaminate food; personal cleanliness practices that help protect food; and the procedure for thorough handwashing.

Step Three: Purchasing, Receiving and Storage-(12 minute videotape). Explains how to choose a supplier; calibrate and use a thermometer properly; accept or reject a delivery; and store food safely.

Step Four: Preparing, Cooking, and Serving-(11 minute videotape). Identifies proper practices for thawing, cooking, holding, serving, cooling and reheating food.

Step Five: Cleaning and Sanitizing-(11 minute videotape). Describes the difference between cleaning and sanitizing; manual and machine warewashing; how sanitizers work; how to store clean items and cleaning supplies; and how to setup a cleaning program.

Step Six: Take the Food Safety Challenge: Good Practices, Bad Practices — You Make the Call!-(35 minute videotape). Challenges viewers to identify good and bad practices presented in five short scenarios from different industry segments.

F2400 **The Amazing World of Microorganisms —** (12 minute videotape). This video will provide your employees with an overview of how microorganisms affect their everyday lives and the foods they produce. The video explores how microscopic creatures are crucial in producing foods, fighting disease, and protecting the environment. In addition, certain microorganisms are responsible for food spoilage, illness, and even death. Equipped with this knowledge, your employees will be better able to protect your brand. (Silliker Laboratories Group, Inc., Homewood, IL-2001)

F2430 **Smart Sanitation: Principles & Practices for Effectively Cleaning Your Food Plant**-(20 minute videotape). A practical training tool for new sanitation employees or as a refresher for veterans. Employees will understand the food safety impact of their day-to-day cleaning and sanitation activities and recognize the importance of their role in your company's food safety program. (Silliker Laboratories Group-1996)

F2370 **Supermarket Sanitation Program-"Cleaning & Sanitizing"**-(13 minute videotape). Contains a full range of cleaning and sanitizing information with minimal emphasis on product. Designed as a basic training program for supermarket managers and employees. (1989) (Reviewed 1998)

F2380 **Supermarket Sanitation Program-"Food Safety"**-(11 minute videotape). Contains a full range of basic sanitation information with mini-

mal emphasis on product. Filmed in a supermarket, the video is designed as a basic program for manager training and a program to be used by managers to train employees. (1989) (Reviewed 1998)

F2390 **Take Aim at Sanitation**–(8 minute videotape). This video features tips on food safety and proper disposal of single service items. Also presented is an emphasis on food contact surfaces as well as the manufacture, storage and proper handling of these items. (Foodservice and Packaging Institute, Inc.–1995). (Available in Spanish)

F2410 **Wide World of Food-Service Brushes**–(18 minute videotape). Discusses the importance of cleaning and sanitizing as a means to prevent and control foodborne illness. Special emphasis is given to proper cleaning and sanitizing procedures and the importance of having properly designed and constructed equipment (brushes) for food preparation and equipment cleaning operations. (1989) (Reviewed 1998)

F2420 **Your Health in Our Hands–Our Health in Yours**–(8 minute videotape). For professional foodhandlers, the tape covers the do's and don'ts of foodhandling as they relate to personal hygiene, temperature control, safe storage and proper sanitation. (Jupiter Video Production–1993). (Reviewed 1998)

OTHER

M4010 **Diet, Nutrition & Cancer**–(20 minute videotape). Investigates the relationship between a person's diet and the risk of developing cancer. The film describes the cancer development process and identifies various types of food believed to promote and/or inhibit cancer. The film also provides recommended dietary guidelines to prevent or greatly reduce the risk of certain types of cancer.

M4020 **Eating Defensively: Food Safety Advice for Persons with AIDS**–(15 minute videotape). While HIV infection and AIDS are not acquired by eating foods or drinking liquids, persons infected with the AIDS virus need to be concerned about what they eat. Foods can transmit bacteria and viruses capable of causing life-threatening illness to persons infected with AIDS. This video provides information for persons with AIDS on what foods to avoid and how to better handle and prepare foods. (FDA/CDC–1989)

M4030 **Ice: The Forgotten Food**–(14 minute videotape). This training video describes how ice is made and where the critical control points are in its manufacture, both in ice plants and in on-premises locations (convenience stores, etc.); it documents the potential for illness from contaminated ice and calls on government to enforce good manufacturing practices, especially in on-premises operations where sanitation deficiencies are common. (Packaged Ice Association–1993)

M4050 **Personal Hygiene & Sanitation for Food Processing Employees**–(15 minute videotape). Illustrates and describes the importance of good personal hygiene and sanitary practices for people working in a food processing plant. (Iowa State–1993)

M4060 **Psychiatric Aspects of Product Tampering**–(25 minute videotape). This was presented by Emanuel Tanay, M.D. from Detroit, at the fall 1986 conference of CSAFDA. He reviewed a few cases and then indicated that abnormal behavior is like a contagious disease. Media stories lead to up to 1,000 similar alleged cases, nearly all of which are false. Tamper-proof packaging and recalls are essential. Tampering and poisoning are characterized by variable motivation, fraud and greed. Law enforcement agencies have the final responsibilities. Tamper proof containers are not the ultimate answer. (1987)

M4070 **Tampering: The Issue Examined**–(37 minute videotape). Developed by Culbro Machine Systems, this videotape is well done. It is directed to food processors and not regulatory sanitarians or consumers. A number of industry and regulatory agency management explain why food and drug containers should be made tamper evident. (Culbro–1987)

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- ❒ D1040 Ether Extraction Method for Determination of Raw Milk
- ❒ D1050 The Farm Bulk Milk Hauler (slides)
- ❒ D1060 Frozen Dairy Products
- ❒ D1070 The Gerber Butterfat Test
- ❒ D1080 High-Temperature, Short-Time Pasteurizer
- ❒ D1090 Managing Milking Quality
- ❒ D1100 Mastitis Prevention and Control
- ❒ D1110 Milk Plant Sanitation: Chemical Solution
- ❒ D1120 Milk Processing Plant Inspection Procedures
- ❒ D1130 Pasteurizer – Design and Regulation
- ❒ D1140 Pasteurizer – Operation
- ❒ D1150 Processing Fluid Milk (slides)

ENVIRONMENTAL

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- ❒ E3020 Acceptable Risks?
- ❒ E3030 Air Pollution: Indoor
- ❒ E3040 Asbestos Awareness
- ❒ E3055 Effective Handwashing-Preventing Cross-Contamination in the Food Service Industry
- ❒ E3060 EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Ceriodaphnia)
- ❒ E3070 EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Fathead Minnow Larva)
- ❒ E3075 EPA: This is Super Fund
- ❒ E3080 Fit to Drink
- ❒ E3110 Garbage: The Movie
- ❒ E3120 Global Warming: Hot Times Ahead
- ❒ E3130 Kentucky Public Swimming Pool & Bathing Facilities
- ❒ E3135 Plastic Recycling Today: A Growing Resource
- ❒ E3140 Putting Aside Pesticides
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- ❒ E3230 The New Superfund: What It is & How It Works – (6) Research & Development/Closing Remarks
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- ❒ E3245 Wash Your Hands
- ❒ E3250 Waste Not: Reducing Hazardous Waste

FOOD

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- ❒ F2005 A Lot on the Line
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- ❒ F2015 Controlling *Listeria*: A Team Approach
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- ❒ F2030 "Egg Games" Foodservice Egg Handling and Safety
- ❒ F2020 Egg Handling & Safety
- ❒ F2036 Emerging Pathogens and Grinding and Cooking Comminuted Beef (2 Videos)
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- ❒ F2100 Tape 1–Food Safety for Food Service: Cross Contamination
- ❒ F2101 Tape 2–Food Safety for Food Service: HACCP
- ❒ F2102 Tape 3–Food Safety for Food Service: Personal Hygiene
- ❒ F2103 Tape 4–Food Safety for Food Service: Time and Temperature Controls
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- ❒ F2110 Food Safety is No Mystery
- ❒ F2130 Food Safety: You Make the Difference
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- ❒ F2148 GMP – GSP Employee
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- ❒ F2147 GMP Basics: Process Control Practices
- ❒ F2160 GMP: Sources & Control of Contamination during Processing
- ❒ F2180 HACCP: Safe Food Handling Techniques
- ❒ F2169 HACCP:Training for Employees–USDA Awareness
- ❒ F2172 HACCP:Training for Managers
- ❒ F2170 The Heart of HACCP
- ❒ F2171 HACCP: The Way to Food Safety
- ❒ F2175 Inspecting For Food Safety – Kentucky's Food Code
- ❒ F2190 Is What You Order What You Get? Seafood Integrity
- ❒ F2210 Northern Delight – From Canada to the World
- ❒ F2240 On the Front Line
- ❒ F2250 On the Line
- ❒ F2270 Pest Control in Seafood Processing Plants
- ❒ F2280 Principles of Warehouse Sanitation
- ❒ F2290 Product Safety & Shelf Life
- ❒ F2220 Proper Handling of Peracidic Acid
- ❒ F2230 Purely Coincidental
- ❒ F2310 Safe Food: You Can Make a Difference
- ❒ F2320 Safe Handwashing
- ❒ F2325 Safe Practices for Sausage Production
- ❒ F2460 Safer Processing of Sprouts
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- ❒ M4060 Psychiatric Aspects of Product Tampering
- ❒ M4070 Tampering: The Issue Examined

Dairy, Food and Environmental Sanitation Instructions for Authors

NATURE OF THE MAGAZINE

Dairy, Food and Environmental Sanitation (*DFES*) is a monthly publication of the International Association for Food Protection. It is targeted for persons working in industry, regulatory agencies or teaching in milk, food and environmental protection.

The major emphases include:

- practical articles in milk, food and environmental protection;
- new product information;
- news from activities and individuals in the field;
- news of the Association affiliate groups and their members;
- 3-A Dairy and Egg Sanitary Standards, amendments and lists of symbol holders;
- excerpts of articles and information from other publications of interest to the readership.

Anyone with questions about the suitability of material for publication should contact the editor.

SUBMITTING ARTICLES AND OTHER MATERIALS

All manuscripts including, "Letters to the Editor" should be submitted in triplicate (original and two copies), in flat form (*not folded*), and by First Class mail to Donna Bahun, Production Editor at the address at the end of these instructions.

When possible, authors are encouraged to submit a fourth copy of their manuscript on computer disk. Manuscripts submitted on disk should be saved as text format.

All reading matter dealing with affairs of the Association or with news and events of interest to Members of the Association is published in *DFES*, and should be mailed to the above address. Correspondence dealing with advertising should also be sent to the address given above.

Correspondence regarding subscriptions or membership in the International Association for Food Protection should be sent to Julie Cattanach, Membership Coordinator, at jcattanach@foodprotection.org or see corresponding information at the end of instructions.

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Manuscripts are accepted for publication only after they are reviewed by two members of the Editorial Board. Occasionally, when the subject of the paper is outside of the specialties of members of the Editorial Board, other specialists may be asked to review manuscripts. After review, a manuscript will be returned to the author by the Scientific Editor for revision in accordance with reviewers' suggestions. Three clean copies of the revised paper and a disk copy are to be returned to the editor as soon as possible. Authors can hasten publication of their papers by submitting well-written manuscripts conforming to the journal's style and by revising and returning manuscripts promptly. If, after review of a manuscript is completed, an author chooses to withdraw rather than revise the paper, the editor should be notified promptly. If an author does not respond in *four months* after a reviewed paper is returned, the paper will be considered as withdrawn. With authors' cooperation, articles are usually published within three to six months after they are received and may appear sooner.

When a manuscript is received, it is numbered, and the author is notified by mail that the manuscript has been received. The manuscript number will be given on the letter and should be used on all future correspondence and revised manuscripts. Authors will be notified when a manuscript has been accepted for publication.

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Page proofs will be sent to authors prior to publication.

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and acknowledgment of both funding sources and any conflicts of interest by the authors is encouraged. In general, the spirit and principles of the International Association for Food Protection Policy on Commercialism also apply to manuscripts submitted for consideration of publication in *Dairy, Food and Environmental Sanitation*. Restricting commercialism benefits the authors and the audience of *Dairy, Food and Environmental Sanitation*. The Scientific Editor shall in his or her sole discretion, determine whether a submitted manuscript violates this policy on commercialism.

TYPES OF ARTICLES

Readers of *DFES* include persons working in industry, regulatory agencies or teaching food safety. *DFES* publishes a variety of papers of interest to food safety professionals. The following types of articles and information are acceptable for publication in *DFES*.

General Interest

DFES regularly publishes nontechnical articles as a service to those readers who are not involved in the technical aspects of food safety. These articles include such topics as the organization and application of food control programs or quality control programs, ways of solving a particular problem in the field, organization and application of an educational program, management skills, use of visual aids and similar subjects. Often talks and presentations given at meetings of affiliate groups and other gatherings can be modified sufficiently to make them appropriate for publication. Authors planning to prepare general interest/nontechnical articles are invited to correspond with the Scientific Editor if they have questions about the suitability of their material.

Book Reviews

Authors and publishers of books relating to food safety are invited to submit their books to the Production Editor. Books will then be reviewed by a specialist in the field covered by the book, and the review will be published in an issue of *DFES*.

PREPARATION OF ARTICLES

The Scientific Editor assumes that the senior author has received proper clearance from his/her organization and from coauthors for publication of the manuscript.

All manuscripts should be typed double-spaced on 8-1/2 by 11 inch white bond paper. *Lines on each page should be numbered to facilitate review of the manuscripts. Manuscripts submitted on paper without numbered lines will be returned to authors.* Margins on all sides should be at least one-inch wide and pages of the original manuscript should not be stapled together.

A manuscript should be read critically by someone other than the author before it is submitted. If English is not the author's first language, the manuscript should be reviewed by a colleague of the author who is fluent in written English to ensure that correct English is used throughout the paper. *The editor and editorial staff will not rewrite papers when the English is inadequate.*

Authors are encouraged to consult previously published issues of *DFES* to obtain a clear understanding of the style of papers published.

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The title of the manuscript should appear at the top of the first page. It should be as brief as possible and contain no abbreviations. The title should be indicative of the subject of the manuscript. Avoid expressions such as "Effects of," "Influence of," "Studies on," etc.

Full names and addresses of each author should appear on the title page. An *asterisk* should be placed after the name of the author to whom correspondence about the paper and proofs should be sent. The E-mail, telephone and facsimile numbers of this author should be given at the bottom of the page. No text of the manuscript should appear on the title page.

The Abstract should appear on a separate piece of paper directly following the title page, and should not exceed 200 words. It should summarize the contents of the manuscript, and be meaningful without having to read remaining pages. The Abstract should *not* contain references, diagrams, tables or unusual abbreviations.

The references should be arranged in alphabetical order, by last name of first author and numbered consecutively. Only the first author's name and initial should be inverted. *Cite each reference in the text by number.* All references given in the list must be cited in the text. List references according to the style of the following examples.

Paper in journal

Alberman, G. G. and E. H. Marth. 1974. Experimental production of aflatoxin in citrus juice and peel. J. Milk Food Technol. 37:308-313.

Paper in book

Marth, E. H. 1974. Fermentations. p. 771-882. *In* B. H. Webb, A. H. Johnson and J. A. Alford. (eds.). Fundamentals of dairy chemistry. 2nd ed. AVI Publishing Co., Westport, CT.

Book by author(s)

Minor, T. E. and E. H. Marth. 1976. Staphylococci and their significance in foods. Elsevier Scientific Publishing Co., Amsterdam.

Book by editor(s)

Vanderzant, C. and D. F. Splittstoesser. (eds.). 1992. Compendium of methods for the microbiological examination of foods. 3rd ed. American Public Health Association, Washington, D.C.

Patent

Hussong, R. V., E. H. Marth and D. G. Vakaleris. 1964. Manufacture of cottage cheese. U.S. Pat. 3,117,870. Jan. 14.

Publication with no identifiable author or editor

Anonymous. 1977. Thermally processed low-acid foods in hermetically sealed containers. Code of Federal Regulations No. 21, U.S. Government Printing Office, Washington, D.C.

References citing "personal communication" or "unpublished data" are discouraged, although it is recognized that sometimes it is unavoidable. An author may be asked to provide evidence of such references.

References consisting of papers that are "accepted for publication" or "in press" are acceptable, but the author may be asked to provide copies of such papers if needed to evaluate the manuscript in question.

Figures and tables should appear on separate pages and not within the text of the manuscript. Placement of tables and figures should be indicated in the text.

ILLUSTRATIONS, PHOTOGRAPHS, FIGURES

Submission of photographs, graphics or drawings to illustrate the article will help the article. The nature of *DFES* allows liberal use of such illustrations, and interesting photographs and drawings often increase the number of persons who read the article.

Photographs. Photographs which are submitted should have sharp images, with good contrast. Photographs can be printed in color, but the additional cost of doing so must be incurred by the author. Authors wishing to publish color photographs should contact Donna Bahun, Production Editor for cost estimates.

The editor encourages the submission of four-color photographs to be used on the cover of *DFES*. Photographs should depict a scene relative to food safety. Please submit your photograph in the form of an EPS file, a negative or slide. Cover photographs will be returned only upon request.

Line drawings. All line drawings (graphs, charts, diagrams, etc.) should be submitted as black and white glossy or matte finish photographs. Use a lettering set or other suitable device for all labeling. If graphs are computer generated, printed copies of the graphs must be produced by a good quality laser printer, with sufficiently dark printing or appropriate size letters and numerals. Graphs produced by dot matrix printers *are not* acceptable. Figures are commonly reduced to a 1-column width (85 mm). Lettering should be of sufficient size to allow for reduction. If symbols are used, they must be identified on the Figure and not in the legend. Data that are presented in Figures should not be repeated in Tables. A well-prepared Figure should be understandable without reference to the text of the paper.

Labeling of figures. All Figures should be labeled lightly on back, using a soft pencil or a typed adhesive label. Labeling should include:

- figure number,
- last name of author(s),
- title of manuscript,
- the manuscript number (on revised copies),
- identification of the top of the figure.

COMMON ABBREVIATIONS

Frequently used acceptable abbreviations may be used (i.e., using *wt* for the word *weight*, or *s* for the word *second*). For further details on abbreviations see the current edition of the *CBE Style Manual* or *ASM Manual of Style*. Note that a period is used with some but not all abbreviations.

Authors may also contact the Production Editor if they are not sure about acceptable abbreviations.

REPRINTS

Reprints of an article may be ordered by the author. An order form for reprints will be sent to the corresponding author. Reprints may be ordered with or without covers, in multiples of 25. Reprint costs vary according to the number of printed pages in the article.

CORRESPONDING ADDRESS

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Dairy, Food and Environmental Sanitation, Vol. 22, No. 1, Pages 62-67

3-A® Sanitary Standards for Plate Type Heat Exchangers, Number 11-06

Formulated by
International Association of Food Industry Suppliers (IAFIS)
International Association for Food Protection (IAFP)
United States Public Health Service (USPHS)
The Dairy Industry Committee (DIC)
The United States Department of Agriculture – Dairy Programs (USDA)

It is the purpose of the IAFIS, IAFP, USPHS, DIC, and USDA in connection with the development of the 3-A Sanitary Standards Program to allow and encourage full freedom for inventive genius or new developments. Plate type heat exchanger specifications heretofore or hereafter developed which so differ in design, materials, and fabrication or otherwise as not to conform to the following standards but which, in the fabricator's opinion, are equivalent or better, may be submitted for the joint consideration of the IAFIS, IAFP, USPHS, DIC, and USDA at any time. The 3-A Sanitary Standards and 3-A Accepted Practices provide hygienic criteria applicable to equipment and systems used to produce, process, and package milk, milk products, and other perishable foods or comestible products. Standard English is the official language of 3-A Sanitary Standards and 3-A Accepted Practices.

A **SCOPE**

A1 These standards cover the sanitary aspects of plate type heat exchangers.

A2 In order to conform to these 3-A Sanitary Standards, plate type heat exchangers shall comply with the following in design, material, and fabrication criteria[1].

B **DEFINITIONS**

B1 *Product:* Shall mean milk and milk products or other comestibles.

B2 **Surfaces**

B2.1 *Product Contact Surfaces:* Shall mean all surfaces which are exposed to the product and surfaces from which liquids may drain, drop, or be drawn into the product.

B2.2 *Nonproduct Contact Surfaces:* Shall mean all other exposed surfaces.

B3 **Cleaning**

B3.1 *Mechanical Cleaning or Mechanically Cleaned:* Shall mean soil removal by impingement, circulation or flowing chemical detergent solutions and water rinses onto and over the surfaces to be cleaned by mechanical means in equipment or systems specifically designed for this purpose.

B3.2 *Manual (COP) Cleaning:* Shall mean soil removal when the equipment is partially or totally disassembled. Soil removal is effected with chemical solutions and water rinses with the assistance of one or a combination of brushes, nonmetallic scouring pads and scrapers, high or low pressure hoses and tank(s) which may be fitted with recirculating pump(s), and with all cleaning aids manipulated by hand.

B4 *Bond:* Shall mean the adhesive or cohesive forces holding materials together. This definition excludes press and shrink fits.

B5 *Easily or Readily Accessible:* Shall mean a location which can be safely reached by personnel from a floor, platform, or other permanent work area.

B6 *Easily or Readily Removable:* Shall mean quickly separated from the equipment with the use of simple hand tools if necessary.

[1]Use current revisions or editions of all referenced documents cited herein.

B7 *Inspectable*: Shall mean all product contact surfaces can be made available for close visual observation.

B8 *Nontoxic Materials:* Shall mean those substances which under the conditions of their use are in compliance with applicable requirements of the Food, Drug, and Cosmetic Act of 1938, as amended.

B9 *Simple Hand Tools:* Shall mean implements such as a screwdriver, wrench, or mallet normally used by operating and cleaning personnel.

C MATERIALS

C1 Metals

C1.1 Product contact surfaces shall be of stainless steel of the American Iron and Steel Institute (AISI) 300 Series[2], (except 301 and 302) (See Appendix, Section E), or metal which under conditions of intended use is at least as corrosion resistant as stainless steel of the foregoing types, and is nontoxic and nonabsorbent.

C2 Nonmetals

C2.1 Rubber and rubber-like materials may be used for gaskets and parts having the same functional purposes.

C2.1.1 Rubber and rubber-like materials, when used for the above-specified application(s), shall conform to the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Rubber and Rubber-Like Materials Used as Product Contact Surfaces in Dairy Equipment, Number 18-.

C2.2 Plastic materials may be used for gaskets and parts having the same functional purposes.

C2.2.1 Plastic materials, when used for the above-specified application(s), shall conform to the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Number 20-.

C2.3 Rubber and rubber-like materials and plastic materials having product contact surfaces shall be of such composition as to retain their surface and conformational characteristics when exposed to the conditions encountered in the environment of intended use and in cleaning, sanitizing, and sterilization treatments.

C2.3.1 The adhesive, if used, on bonded rubber and rubber-like materials and bonded plastic materials shall be nontoxic[3].

C3 Nonproduct Contact Surfaces

C3.1 All nonproduct contact surfaces shall be of corrosion-resistant material or material that is rendered corrosion resistant. If coated, the coating used shall adhere. All nonproduct contact surfaces shall be relatively nonabsorbent, durable, and cleanable. Parts removable for cleaning having both product contact and nonproduct contact surfaces shall not be painted.

C4 Sterilizability

C4.1 In a processing system to be sterilized by heat and operated at a temperature of 250°F (121°C) or higher, all materials having product contact surface(s) used in the construction of plate type heat exchangers and nonmetallic component parts shall be such that they can be (1) sterilized by saturated steam or water under pressure (at least 15.3 psig or 106 kPa) at a temperature of at least 250°F (121°C) and (2) operated at the temperature required for processing.

D FABRICATION

D1 Surface Texture

D1.1 All product contact surfaces shall have a finish at least as smooth as a No. 4 ground finish on stainless steel sheets and be free of imperfections such as pits, folds and crevices in the final fabricated form. (See Appendix, Section F.)

D2 Permanent Joints

D2.1 All permanent joints in metallic product contact surfaces shall be continuously welded.

D3 Bonded Materials

D3.1 Bonded rubber and rubber-like materials and bonded plastic materials having product contact surfaces shall be bonded in a manner that the bond is continuous and mechanically sound, so that when exposed to the conditions encountered in the

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[2]The data for this series are contained in the *AISI Steel Products Manual, Stainless & Heat Resisting Steels*, Table 2-1. Available from the American Iron and Steel Society, 410 Commonwealth Drive, Warrendale, PA 15086 (412) 776-1535.

[3]Adhesives shall comply with 21 CFR 175 - Indirect Food Additives: Adhesives and Components of Coatings. Document for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (202) 512-1800.

environment of intended use and in cleaning and bactericidal treatment or sterilization, the rubber and rubber-like material or the plastic material does not separate from the base material to which it is bonded.

D4 **Cleaning and Inspectability**

D4.1 Plate type heat exchangers that are to be mechanically cleaned shall be designed so that the product contact surfaces of the plate type heat exchanger and all nonremoved appurtenances thereto can be mechanically cleaned and are easily accessible, readily removable, and inspectable.

D4.2 Product contact surfaces not designed to be mechanically cleaned shall be easily accessible for cleaning and inspection either when in an installed position or when removed. Demountable parts shall be readily removable.

D4.3 Appurtenances having product contact surfaces shall be readily removable, or they shall be readily cleanable when assembled or installed, and shall be easily accessible for inspection.

D4.4 There shall be no more than eight (8) clamping bolts. Bolts, if used, shall be located in cutouts so as to be easily removable.

D4.5 Plate heat exchangers shall be so constructed that when opened, plates and terminal frames may be separated to provide a space for cleaning and inspection equal to the lesser of the width of one plate or 15 in. (381 mm).

D5 **Fittings**

D5.1 All sanitary fittings and connections shall conform to the applicable provisions of the 3-A Sanitary Standards for Sanitary Fittings for Milk and Milk Products, Number 63-.

D6 **Radii**

D6.1 All internal angles of less than 135° on product contact surfaces shall have radii of not less than 1/4 in. (6.35 mm). except that:

D6.1.1 The radii in grooves in gaskets or gasket retaining grooves shall be not less than 1/8 in. (3.18 mm) except for those for standard 1/4 in. (6.35 mm) and smaller O-rings, and those provided for in Section D5.1.

D7 **Threads**

D7.1 There shall be no threads on product contact surfaces.

D8 **Gaskets**

D8.1 Heat transfer plate gaskets shall be continuous and shall be removable or shall be bonded to the heat transfer plate.

D8.2 Gasket retaining grooves in product contact surfaces for removable gaskets shall not exceed 1/4 in. (6.35 mm) in depth or be less than 1/4 in. (6.35 mm) wide except those for standard O-rings smaller than 1/4 in. (6.35 mm), and those provided for in Section D5.1.

D9 **Leak Detector Groove**

D9.1 A leak detector groove of sufficient width to be readily cleanable and open to the atmosphere at both ends shall be provided to allow the leakage past the gaskets to drain to atmosphere so as to prevent accumulation of product.

D10 **Sterilization Systems**

D10.1 Plate heat exchangers used in a processing system to be sterilized by heat and operated at a temperature of 250°F (121°C) or higher shall comply with the following additional criteria:

D10.2 The construction shall be such that all product contact surfaces can be (1) sterilized by saturated steam or water under pressure (at least 15.3 psig or 106 kPa) at a temperature of at least 250°F (121°C) and (2) operated at the temperature required for processing.

D10.3 Plate heat exchangers that have a product contact surface(s) to be used in such a processing system, not designed so that the system is automatically shut down if the product pressure in the system becomes less than that of the atmosphere and cannot be restarted until the system is re-sterilized, shall have a steam or other sterilizing medium chamber surrounding the plate heat exchangers at the product contact surface if required to maintain sterility. The plate heat exchangers shall be constructed so that the steam chamber or other sterilizing medium chamber may be exposed for inspection.

D10.4 Where steam or other sterilizing medium is used, the connection(s) on the plate heat exchangers shall be such that the steam lines or other sterilizing medium lines can be securely fastened to the plate heat exchangers. The plate heat exchangers shall be constructed so that the steam or other sterilizing medium chamber may be exposed for inspection.

D10.5 The seal(s) in a plate heat exchanger(s) designed to be used in a processing system to be sterilized by heat and operated at a temperature of 250°F (121°C) or higher shall be between the product contact surface and the steam or other sterilizing chamber.

D11 **Supports**

D11.1 The means of supporting a plate heat exchanger shall be one of the following:

D11.1.1 If legs are used, they shall be smooth with rounded ends or with a flat, load-bearing foot suitable for sealing to the floor, and have no exposed threads. Legs made of hollow stock shall be sealed. Legs shall provide a minimum clearance between the lowest part of the base and the floor of not less than 4.0 in. (101.6 mm).

D11.1.2 Plate heat exchangers that are designed for mounting on a wall or column shall have at least 4.0 in. (101.6 mm) clearance between the outside of the plate heat exchanger and the wall or column.

D12 **Nonproduct Contact Surfaces**

D12.1 Nonproduct contact surfaces, except for clamping bolts and the crevices between the plates, shall have a smooth finish, free of pockets and crevices, and be readily cleanable. Surfaces to be coated shall be effectively prepared for coating.

D13 **Information Plate**

D13.1 A plate heat exchanger(s) shall have an information plate in juxtaposition to the nameplate giving the following (the information may appear on the nameplate):

(1) maximum temperature and pressure at which the plate heat exchangers can be operated.

(2) statement that, to prevent corrosion, the recommendations of the plate heat exchangers' manufacturer should be followed with respect to time, temperature, and the concentration of specific cleaning solutions and chemical bactericides.

D13.2 The information or nameplate shall also provide the following: "This plate heat exchanger * designed for steam sterilization."

D13.2.1 * insert one of the following:
(a) "is"
(b) "is not"

APPENDIX
E STAINLESS STEEL MATERIALS

E1 Stainless steel conforming to the applicable chemical composition ranges established by AISI for wrought products (Table 1) should be considered in compliance with the requirements of Section C1 herein. Where welding is involved, the carbon content of the stainless steel should not exceed 0.08%. The first reference cited in C1 sets forth the chemical ranges and limits of acceptable stainless steel of the 300 Series.

TABLE 1:

WROUGHT PRODUCTS TYPICALLY USED			
UNS #	**ASTM[4]**	**AISI/ SAE[2]**	**Properties**
S30300	A-582	303	Free-Machining S.S.; Austenitic
S30400	A-276 A-666	304	Austenitic S.S.
S30403	A-276 A-666	304L	Low Carbon Austenitic S.S.
S31600	A-276 A-666	316	Austenitic S.S. plus Mo*
S31603	A-276 A-666	316L	Low Carbon Austenitic S.S. plus Mo*

*Molybdenum

F PRODUCT CONTACT SURFACE FINISH

Surface finish equivalent to 150 grit or better as obtained with silicon carbide, properly applied on stainless steel sheets, is considered in compliance with the requirements of Section D1 herein. A maximum R_a of 32 µin. (0.80 µm), when measured according to the recommendations in American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME)[5] B46.1 – *Surface Texture*, is considered to be equivalent to a No. 4 finish.

G Location

G1 Heat exchanger presses (or frames) should be located at a sufficient distance from walls to permit easy access to the plates.

[4]Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. Phone: (610) 832-9500.

[5]Available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017-2392 (212) 705-7722.

TABLE 2 OPTIONAL METAL ALLOY

Optional metal alloys having the following compositions are examples considered in compliance with Section C1.1 herein. (Percentages are maximum unless range is given.)

	UNS N08367	UNS S21800	UNS S20161	UNS N26055	UNS N26455	UNS S17400	UNS S15500	UNS S32900	UNS R20500	UNS R50400
	ASTM A743 Grade CN-3MN	ASTM A743 Grade CF-10 SMnN		ASTM A494 Grade CY5SnBiM	ASTM A494 Grade CW-2M	ASTM A747 Grade CB7Cu-1	ASTM A747 Grade CB7Cu-2		ASTM A560 Grade 50Cr-50Ni	ASTM B67 Grade C-2
C	0.03	0.10	0.15	0.05	0.02	0.07	0.07	0.20	0.10	0.10
Mn	2.00	7.00-9.00	4.00-6.00	1.5	1.00	0.70	0.70	1.00	0.30	
Si	1.00	3.50-4.50	3.00-4.00	0.5	0.80	1.00	1.00	0.75	1.00	
P	0.040	0.040	0.040	0.03	0.03	0.035	0.035	0.040	0.02	
S	0.010	0.030	0.040	0.03	0.03	0.03	0.03	0.030	0.02	
Cr	20.0-22.0	16.00-18.00	15.0-18.0	11.0-14.0	15.0-17.5	5.50-17.7	14.0-15.50	23.0-28.0	48.0-52.0	
Ni	23.5-25.5	8.00-9.00	4.00-6.00	Balance	Balance	3.60-4.60	4.50-5.50	2.50-5.00	Balance	
Mo	6.0-7.0			2.0-3.5	15.0-17.5			1.00-2.00		
Cb						0.15-0.35	0.15-0.35			
Cu	0.75					2.50-3.20	2.50-3.20			
N	0.18-0.26	0.08-0.18	0.08-0.20			0.05	0.05		0.30	
Fe	Balance	Balance	Balance	2.00	2.00	Balance	Balance	Balance	1.00	0.30
Sn				3.0-5.0						
Bi				3.0-5.0						
W					1.0					
Ti									0.50	Balance
Al									0.25	
Other										H = 0.015 N = 0.03 O = 0.25

E2 Metal alloys or metals other than the above may be as corrosion resistant as 300 Series Stainless steel. This may be shown when metal alloys or metals are tested in accordance with ASTM G31 Laboratory Immersion Corrosion Testing of Metals and have a corrosion rate of less than 10 mil per year. The test parameters such as the type of chemical(s), their concentration(s), and temperature(s) should be representative of cleaning and sanitizing conditions used in dairy equipment. Alloys containing lead, leachable copper, or other toxic metals should not be used.

G2 There should be unobstructed access to one side of the heat exchanger.

H ENGINEERING DESIGN AND TECHNICAL CONSTRUCTION FILE

The following is an example of an engineering design and technical construction file (EDTCF) to be maintained by the fabricator as evidence of complying with 3-A Sanitary Standards or 3-A Accepted Practices. (The file may contain more or less information as applicable to the equipment or system.)

H1 Purpose

H1.1 To establish and document the material, fabrication, and installation (where appropriate) requirements for the engineering design and technical construction files for all products, assemblies, and sub-assemblies supplied by the manufacturer thereof to be in compliance with the sanitary criteria found in 3-A Sanitary Standards or 3-A Accepted Practices. It is recommended that the engineering and construction file or files be submitted with applications for 3-A Symbol use authorization.

H2 Scope

H2.1 This EDTCF applies to equipment specified by:

H2.1.1 3-A Sanitary Standards for Plate Type Heat Exchangers, Number 11-.

H3 Responsibilities

H3.1 This EDTCF is maintained by: The Engineering Manager (or other company official) **{name and title of responsible official}** is responsible for maintaining, publishing, and distributing this EDTCF.

H3.2 Implementation: All divisions, specifically development engineering, standards engineering, sales engineering, and product departments are responsible for implementing this EDTCF.

H4 **Applicability**

H4.1 The 3-A Sanitary Standards and 3-A Accepted Practices are voluntarily applied as suitable sanitary criteria for dairy and food processing equipment. 3-A Sanitary Standards are referenced in the Grade A Pasteurized Milk Ordinance: "Equipment manufactured in conformity to 3-A Sanitary Standards complies with the sanitary design and construction standards of this Ordinance."

H5 **References**

H5.1 List any additional regulations that apply to the equipment or system covered by this EDTCF.

H5.2 Date of conformity or 3-A Symbol Authorization and certificate number, if authorized.

H6 **Design and Technical Construction File**

H6.1 The Engineering Design and Technical Construction File may consist of the following:

a. an overall drawing of the subject equipment;
b. full detailed drawings, accompanied by any calculations, notes, test results, etc. required to check the conformity of the equipment with the 3-A Standards or 3-A Practices;
c. a list of:
   (1) the essential requirements of the standards or practices;
   (2) other technical specifications, which were used when the equipment was designed;
d. a description of methods adopted;
e. if essential, any technical report or certificate obtained from a competent testing body or laboratory;
f. any technical report giving the results of tests carried out internally by Engineering or others;
g. documentation and test reports on any research or tests on components, assemblies and/or the complete product to determine and demonstrate that by its design and construction the product is capable of being installed, put into service, and operated in a sanitary manner (optional);
h. a determination of the foreseeable lifetime of the product (optional);
i. a copy of the instructions for the product (Instruction Manuals/Instruction Books);
j. for serial manufacturing, the internal measures that will be implemented to insure that the equipment will continue to be manufactured in conformity to the provisions of the 3-A Sanitary Standards or 3-A Accepted Practices;
k. engineering reports;
l. laboratory reports;
m. bills of material;
n. wiring diagrams, if applicable;
o. sales order engineering files;
p. hazard evaluation committee reports, if executed;
q change records;
r. customer specifications;
s. any notified body technical reports and certification tests;
t. copy of the 3-A Symbol authorization, if applicable.

H6.2 The file does not have to include detailed plans or any other specific information regarding the sub-assemblies, tooling, or fixtures used for the manufacture of the product unless a knowledge of them is essential for verification of conformity to the basic sanitary requirements found in 3-A documents.

H6.3 The documentation referred to in H6.1 above need not permanently exist in a material manner in the EDTCF, but it must be possible to assemble them and make them available within a period of time commensurate with its importance (one week is considered reasonable time). As a minimum, each product EDTCF must physically contain an index of the applicable document of H6.1 above.

H6.4 The EDTCF may be in hard copy or software form.

H7 **Confidentiality**

H7.1 The EDTCF is the property of the manufacturer and is shown at their discretion, except that all or part of this file will be available to the 3-A Symbol Council or a regulatory agency for cause and upon request.

H8 **File Location**

H8.1 The EDTCF shall be maintained at **{location}**.

H9 **File Retention**

H9.1 The EDTCF (including all documentation referred to in H6.1) shall be retained and kept available for 12 years following the date of placing the product in use or from the last unit produced in the case of series manufacture.

These standards are effective November 20, 2001.

Dairy, Food and Environmental Sanitation, Vol. 22, No. 1, Pages 68-75

3-A® Sanitary Standards for Sifters for Dry Products, Number 26-04

Formulated by
International Association of Food Industry Suppliers (IAFIS)
International Association for Food Protection (IAFP)
United States Public Health Service (USPHS)
The Dairy Industry Committee (DIC)
The United States Department of Agriculture – Dairy Programs (USDA)

It is the purpose of the IAFIS, IAFP, USPHS, DIC, and USDA in connection with the development of the 3-A Sanitary Standards Program to allow and encourage full freedom for inventive genius or new developments. Dry products sifter specifications heretofore or hereafter developed which so differ in design, materials, and fabrication or otherwise as not to conform to the following standards but which, in the fabricator's opinion, are equivalent or better, may be submitted for the joint consideration of the IAFIS, IAFP, USPHS, DIC, and USDA at any time. The 3-A Sanitary Standards and 3-A Accepted Practices provide hygienic criteria applicable to equipment and systems used to produce, process and package milk, milk products and other perishable foods or comestible products. Standard English is the official language of 3-A Sanitary Standards and 3-A Accepted Practices.

A **SCOPE**

A1 These standards cover the sanitary aspects of sifters used for processing dry products beginning at, as appropriate, the inlets for products, cleaning solutions, processing air and terminating at the outlets for product, processing air, cleaning solutions or rejected material.

A2 In order to conform to these 3-A Sanitary Standards, sifting equipment shall comply with the following design, material, and fabrication criteria[1].

B **DEFINITIONS**

B1 *Product:* Shall mean dry milk, dry milk products and other dry comestibles.

B2 **Surfaces**

B2.1 *Product Contact Surfaces:* Shall mean all surfaces which are exposed to the product, or from which other materials may drain, drop, diffuse, or be drawn into the product.

B2.2 *Nonproduct Contact Surfaces:* Shall mean all other exposed surfaces.

B3 **Cleaning**

B3.1 *Mechanical Cleaning or Mechanically Cleaned:* Shall mean soil removal by impingement, circulation, or flowing chemical detergent solutions and water rinses onto and over the surfaces to be cleaned by mechanical means in equipment or systems specifically designed for this purpose.

B3.2 *Manual (COP) Cleaning:* Shall mean soil removal when the equipment is partially or totally disassembled. Soil removal is effected with chemical solutions and water rinses with the assistance of one or a combination of brushes, nonmetallic scouring pads and scrapers, high or low pressure hoses and tank(s) which may be fitted with recirculating pump(s), and with all cleaning aids manipulated by hand.

B4 *Bond*: Shall mean the adhesive or cohesive forces holding materials together. This definition excludes press and shrink fits.

B5 *Corrosion Resistant:* Shall mean the surface has the property to maintain its original surface characteristics for its predicted service period when exposed to the conditions encountered in the environment of intended use, including expected contact with product, cleaning, and sanitizing compounds or solutions.

[1]Use current revisions or editions of all referenced documents cited herein.

B6 *Easily or Readily Accessible:* Shall mean a location which can be safely reached by personnel from a floor, platform, or other permanent work area.

B7 *Easily or Readily Removable:* Shall mean quickly separated from the equipment with the use of simple hand tools if necessary.

B8 *Inspectable*: Shall mean all product contact surfaces can be made available for close visual observation.

B9 *Nontoxic Materials:* Shall mean those substances which under the conditions of their use are in compliance with applicable requirements of the Food, Drug, and Cosmetic Act of 1938, as amended.

B10 *Simple Hand Tools:* Shall mean implements such as a screwdriver, wrench, or mallet normally used by operating and cleaning personnel.

C MATERIALS

C1 Metals

C1.1 Product contact surfaces shall be of stainless steel of the American Iron and Steel Institute (AISI) 300 Series, (except 301 and 302)[2] or corresponding Alloy Cast Institute (ACI)[3] types (See Appendix, Section E), or metal which under conditions of intended use is at least as corrosion resistant as stainless steel of the foregoing types, and is nontoxic and nonabsorbent, except that:

C1.1.1 Solder, when used, shall be silver containing solder and shall be corrosion-resistant, free of cadmium, lead and antimony, nonabsorbent, and shall not impart any toxic substance to the product when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment.

C2 Nonmetals

C2.1 Rubber and rubber-like materials may be used for balls, gaskets, flexible connectors, inspection ports, vibration dampeners, bonding screening media to screen frame assemblies, and parts having the same functional purposes.

C2.1.1 Rubber and rubber-like materials when used for the above-specified applications, except for vibration dampeners and bonding screening media to screen frame assemblies, shall comply with the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Rubber and Rubber-Like Materials Used as Product Contact Surfaces in Dairy Equipment, Number 18-.

C2.1.2 Rubber and rubber-like materials used for vibration dampeners and bonding screen media to screen frame assemblies shall be constructed of materials meeting Title 21 Part 177 of the Code of Federal Regulations and be nontoxic and nonabsorbent and retain their surface and conformational characteristics when exposed to conditions encountered in the environment of intended use and in cleaning and bactericidal treatment.

C2.2 Plastic materials may be used for screening media, screen frame assemblies, vibration dampeners, bonding screening media to screen frame assemblies, balls, gaskets, flexible connectors, inspection port covers and parts having the same functional purposes.

C2.2.1 Plastic and plastic-like materials when used for the above specified applications shall comply with the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Number 20-.

C2.3 Bonded rubber and rubber-like materials and bonded plastic materials having product contact surfaces shall be of such composition as to retain their surface and conformational characteristics when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment.

C2.4 The adhesive, if used, on bonded rubber and rubber-like materials and bonded plastic materials shall be nontoxic[4].

C2.5 Cotton, linen, silk, or synthetic fibers may be used for flexible connectors and screening media. These materials shall be nontoxic, easily cleanable, and shall not impart a flavor to the product.

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[2]The data for this series are contained in the *AISI Steel Products Manual, Stainless & Heat Resisting Steels,* Table 2-1. Available from the American Iron and Steel Society, 410 Commonwealth Drive, Warrendale, PA 15086 (412) 776-1535.

[3]Alloy Casting Institute Division. Steel Founders Society of America, Cast Metal Federation Building, 455 State Street, Des Plaines, IL 60016 (708) 299-9160.

[4]Adhesives shall comply with 21 CFR 175 - Indirect Food Additives: Adhesives and Components of Coatings. Document for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (202) 512-1800.

C3 **Nonproduct Contact Surfaces**

C3.1 All nonproduct contact surfaces shall be of corrosion-resistant material or material that is rendered corrosion resistant. If coated, the coating used shall adhere. All nonproduct contact surfaces shall be relatively nonabsorbent, durable, and cleanable. Parts removable for cleaning having both product contact and nonproduct contact surfaces shall not be painted.

D **FABRICATION**

D1 **Surface Texture**

D1.1 All product contact surfaces, except those of screens, shall be at least as smooth as a No. 4 ground finish on stainless steel sheets free of imperfections such as pits, folds and crevices in the final fabricated form. (See Appendix, Section F).

D1.2 The use of stainless steel sheets with a No. 2B finish, (less than or equal to 32 min. Ra), free of imperfections such as pits, folds, and crevices in the final fabricated form is acceptable.

D2 **Permanent Joints**

D2.1 All permanent joints in metallic product contact surfaces shall be continuously welded. Welding shall produce product contact surfaces which are at least as smooth as a No. 4 ground finish on stainless steel sheets and which are free of imperfections such as pits, folds, and crevices.

D3 **Bonded Material**

D3.1 Bonded rubber and rubber-like materials and bonded plastic materials having product contact surfaces shall be bonded in such a manner that the bond is continuous and mechanically sound, so that when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment, the rubber and rubber-like material or the plastic material does not separate from the base material to which it is bonded.

D4 **Screen Attachment**

D4.1 Solder may be used to fill the joints where the screen is attached to the frame. The resulting joint shall be completely flooded with solder and be free of pits, folds and crevices.

D4.2 Rubber and rubber-like materials and plastic materials may be used for attaching the screening media to the screen frame assembly provided the material fully floods the surfaces joined and is free of pits, folds and crevices.

D5 **Cleaning and Inspectability**

D5.1 Sifters that are to be mechanically cleaned shall be designed so that the product contact surfaces and all nonremoved appurtenances thereto can be mechanically cleaned and are easily accessible, readily removable, and inspectable.

D5.2 Product contact surfaces not designed to be mechanically cleaned shall be easily accessible for cleaning and inspection either when in an installed position or when removed. Demountable parts shall be readily removable.

D5.3 Appurtenances having product contact surfaces shall be readily removable, or they shall be readily cleanable when assembled or installed, and shall be easily accessible for inspection.

D6 **Fittings**

D6.1 All sanitary fittings and connections shall conform to the applicable provisions of the 3-A Sanitary Standards for Sanitary Fittings for Milk and Milk Products, Number 63-.

D7 **Oversized Material Discharge**

D7.1 Means shall be provided for the prompt, continuous removal of oversized material.

D8 **Gaskets**

D8.1 Gaskets having a product contact surface(s) shall be removable or bonded.

D8.2 Grooves in gaskets shall be no deeper than their width unless the gasket is readily removable and reversible for cleaning.

D8.3 Gasket retaining grooves in product contact surfaces for removable gaskets shall not exceed 1/4 in. (6.35 mm) in depth or be less than 1/4 in. (6.35mm) wide except those for standard O-rings smaller than 1/4 in. (6.35 mm), and those provided for in the 3-A Sanitary Standards referenced in Section D6.1.

D9 **Radii**

D9.1 All internal angles of less than 135°on product contact surfaces shall have radii of not less than 1/4 in. (6.35 mm), except that:

D9.1.1 Smaller radii may be used when they are required for essential functional reasons, such as those for vibration dampers, and for bonding screening media to screen frame assemblies. In no case shall such radii be less than 1/8 in. (3.18 mm).

D9.1.2 The radii in grooves in gaskets or gasket retaining grooves shall be not less than 1/16 in. (1.59 mm); except for those for standard 1/4 in. (6.35 mm) and smaller O-rings, and those provided for in the 3-A Sanitary Standards referenced in Section D6.1.

D9.1.3 Radii in standard O-ring grooves shall be as specified in Appendix, Section J.

D9.1.4 Radii in nonstandard O-ring grooves shall be those radii closest to a standard O-ring as specified in Appendix, Section J.

D9.1.5 When the thickness of one or both parts joined is less than 3/16 in. (4.76 mm), the minimum radii for fillets of welds on product contact surfaces shall be not less than 1/8 in. (3.18 mm).

D10 **Openings and Covers**

D10.1 The edges of openings in the cover shall extend upward at least 3/8 in. (9.52 mm). Openings not continually in use shall be provided with removable covers having a downward flange of at least 1/4 in. (6.35 mm).

D10.2 Sight and light openings provided shall conform to the applicable provisions of the 3-A Sanitary Standards for Sight and/or Light Windows and Sight Indicators in Contact with Milk and Milk Product, Number 65-.

D11 **Threads**

D11.1 There shall be no exposed threads on product contact surfaces.

D12 **Supports**

D12.1 The means of supporting a sifter shall be one of the following:

D12.1.1 If legs are used, they shall be smooth with rounded ends or with flat, load-bearing feet suitable for sealing to the floor, and have no exposed threads. Legs made of hollow stock shall be sealed. Legs shall provide a minimum clearance between the lowest part of the base and the floor of not less than 6 in. (152.4 mm).

D12.1.2 If mounted on a pedestal, the base of the pedestal shall be sealed to the mounting surface. If the sifter will not be mounted on a slab or island, the pedestal shall be provided with adjustable legs and necessary clearance as required in D12.1.1.

D12.1.3 If mounted on a wall or column, the point of attachment of a sifter to its mounting shall be designed for sealing. The mounting, if supplied by the manufacturer, shall be designed for sealing to the wall or column. The design of a sifter to be mounted on a wall or column shall be such that there will be at least a 4 in. (101.6 mm) clearance between the outside of the sifter and the wall or column.

D12.1.4 If suspended with cable(s), the cable ends shall be concealed or enclosed. When means of suspending a sifter is other than a cable, the supports shall be smooth and have no exposed threads or other conditions which may provide areas which are difficult to clean.

D13 **Nonproduct Contact Surfaces**

D13.1 Nonproduct contact surfaces shall have a smooth finish, free of pockets and crevices, and be cleanable and those surfaces to be coated shall be effectively prepared for coating.

D13.2 Exposed threads shall be minimized. Exposed braided coverings of cable or hose shall not be used. No continuous or piano-type hinges shall be used on the equipment or its control cabinets. Electrical and utility connections shall be as remote as practical from the product areas. Riveted nameplates or appendages shall not be used. Socket head cap screws shall not be used. Knurled surfaces shall not be used. Nameplates shall be welded or effectively sealed to the equipment. External lap joints for sheathing over insulated areas shall be overlapped downward. Overlapped joints shall be sealed between the mating surfaces with a suitable sealant. Supporting structures, braces, catwalks, stairs, handrails and guards are not considered as nonproduct contact surfaces of the equipment and are considered as part of the building structure. Panels or doors shall be provided to allow easy access to the interior of the equipment. Use of hinges, wing nuts, latches, and similar easy-opening fastening devices is recommended.

D13.3 A guard(s) required by a safety standard that will not permit accessibility for cleaning and inspection in place shall be designed so it (they) can be removed with the use of simple hand tools.

D14 **Screening Media**

D14.1 Woven stainless steel wire provided for in C1.1 or woven materials provided for in C2.2 and in C2.3 may be used for screening media.

D15 **Flexible Connections**

D15.1 Product contact surfaces of flexible connections shall have straight sides without corrugations except that:

D15.1.1 Flexible connections less than 18 in. (457.2 mm) long which are used in a vertical position may have corrugations which have a radius of not less than

0.5 in. (12.7 mm) and are no deeper than their width.

D15.2 If a flexible connection is a hose assembly it shall comply with applicable provisions of the 3-A Sanitary Standards for Hose Assemblies, Number 62-.

APPENDIX

E STAINLESS STEEL MATERIALS

E1 Stainless steel conforming to the applicable composition ranges established by AISI for wrought products, or by ACI for cast products, should be considered in compliance with the requirements of Section C1 herein. Where welding is involved the carbon content of the stainless steel should not exceed 0.08%.

TABLE 1

WROUGHT PRODUCTS TYPICALLY USED			
UNS #	ASTM[5]	AISI/SAE[2]	Properties
S30300	A-582	303	Free-Machining S.S.; Austenitic
S30400	A-276 A-666	304	Austenitic S.S.
S30403	A-276 A-666	304L	Low Carbon Austenitic S.S.
S31600	A-276 A-666	316	Austenitic S.S. plus Mo*
S31603	A-276 A-666	316L	Low Carbon Austenitic S.S. plus Mo*

*Molybdenum

TABLE 2

CAST PRODUCTS			
UNS #	ASTM[5]	ACI[6]	Common Names
J92500	A-351 A-743 A-744	CF-3	Cast 304L
J92800	A-351 A-743 A-744	CF-3M	Cast 316L
J92600	A-351 A-743 A-744	CF-8	Cast 304
J92900	A-351 A-743 A-744	CF-8M	Cast 316
J92180	A-747	CB7 Cu — 1	Cast 17-4 PH
J92110	A-747	CB7 Cu —2	Cast 15-5 PH
N26055	A-494	CY5Sn BiM	Alloy 88
J92701	A-743	CF-16F	Free Machining Austenitic S.S.

F PRODUCT CONTACT SURFACE FINISH

Surface finish equivalent to 150 grit or better as obtained with silicon carbide, properly applied on stainless steel sheets, is considered in compliance with the requirements of Section D1 herein. A maximum R_a of 32 min. (0.80 mm), when measured according to the recommendations in American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME)[7] B46.1 – *Surface Texture*, is considered to be equivalent to a No. 4 finish.

G SLABS OR ISLANDS

When the sifter is designed to be installed on a slab or an island, the dimensions of the slab or island should be such that the base of the sifter will extend beyond the slab or island at least 1 in. in all horizontal directions. The slab or island should be of sufficient height that the bottom of all product connections are not less than 4 in. (102 mm) above the floor. The surface of the slab or island should be coated with a thick layer of waterproof mastic material, which will harden without cracking. The junction of the sifter base and the slab or island should be sealed.

H SCREEN SIZES

For the general guidance of sifter manufacturers and the dry milk industry, the following screen size openings may be considered as recommended openings to result in satisfactory screening of the listed dry milk products:

Product:	Max. Sieve Opening	
	mm	in. (approx.)
Nonfat dry milk	0.707	0.027
Dry whole & dry buttermilk	1.19	0.047

It is recognized that larger screen size openings may be necessary for sifting certain special dry milk products (such as "instant" products) and for desired classification of products on the basis of different particle sizes. Openings referred to above are based on general experience as to what constitutes satisfactory screening to remove product lumps or foreign materials, and also on ability of most currently used sifters to successfully sift dry milk products through such size openings without excessive loss of fine product into the oversized material discharge. Other factors also affect such loss, such as percent of "open area" in screen used, uneven flow rates to the sifter, ratio of screening surface area to dryer capacity, amount and kind of mechanical energy applied to the screening surface, sifter design and construction, and nature of dry milk product being sifted.

[5]Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. Phone: (610) 832-9500.

[6]Alloy Casting Institute Division, Steel Founders Society of America, Cast Metal Federation Building, 455 State Street, Des Plaines, IL 60016 (708) 299-9160.

[7]Available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017-2392 (212) 705-7722.

TABLE 3 - OPTIONAL METAL ALLOY

Optional metal alloys having the following compositions are examples considered in compliance with Section C herein. (Percentages are maximum unless range is given.)

	UNS N08367	UNS S21800	UNS S20161	UNS N26055	UNS N26455	UNS S17400	UNS S15500	UNS S32900	UNS R20500	UNS R50400
	ASTM A743 Grade CN-3MN	ASTM A743 Grade CF-10 SMnN		ASTM A494 Grade CY5SnBiM	ASTM A494 Grade CW-2M	ASTM A747 Grade CB7Cu-1	ASTM A747 Grade CB7Cu-2		ASTM A560 Grade 50Cr-50Ni	ASTM B67 Grade C-2
C	0.03	0.10	0.15	0.05	0.02	0.07	0.07	0.20	0.10	0.10
Mn	2.00	7.00-9.00	4.00-6.00	1.5	1.00	0.70	0.70	1.00	0.30	
Si	1.00	3.50-4.50	3.00-4.00	0.5	0.80	1.00	1.00	0.75	1.00	
P	0.040	0.040	0.040	0.03	0.03	0.035	0.035	0.040	0.02	
S	0.010	0.030	0.040	0.03	0.03	0.03	0.03	0.030	0.02	
Cr	20.0-22.0	16.00-18.00	15.0-18.0	11.0-14.0	15.0-17.5	5.50-17.7	14.0-15.50	23.0-28.0	48.0-52.0	
Ni	23.5-25.5	8.00-9.00	4.00-6.00	Balance	Balance	3.60-4.60	4.50-5.50	2.50-5.00	Balance	
Mo	6.0-7.0			2.0-3.5	15.0-17.5			1.00-2.00		
Cb						0.15-0.35	0.15-0.35			
Cu	0.75					2.50-3.20	2.50-3.20			
N	0.18-0.26	0.08-0.18	0.08-0.20			0.05	0.05		0.30	
Fe	Balance	Balance	Balance	2.00	2.00	Balance	Balance	Balance	1.00	0.30
Sn				3.0-5.0						
Bi				3.0-5.0						
W					1.0					
Ti									0.50	Balance
Al									0.25	
Other										H = 0.015 N = 0.03 O = 0.25

E2 Metal alloys or metals other than the above may be as corrosion resistant as 300 Series Stainless steel. This may be shown when metal alloys or metals are tested in accordance with ASTM G31 Laboratory Immersion Corrosion Testing of Metals and have a corrosion rate of less than 10 mil per year. The test parameters such as the type of chemical(s), their concentration(s), and temperature(s) should be representative of cleaning and sanitizing conditions used in dairy equipment. Alloys containing lead, leachable copper, or other toxic metals should not be used.

Screen openings dimensions may be obtained by any desired combination of wire thickness and number of wires per in. For instance, if the screening surface is made of stainless steel woven wire, the 0.027 in. (0.685 mm) opening might be obtained by using 24 × 24 mesh market grade screen cloth made of wire 0.014 in. (0.356 mm) thick (about 45% open area) or by using 30 × 30 bolting cloth screen made of wire 0.0065 in. (0.165 mm) (about 65% open area) or by many other mesh-wire thickness combinations. These combinations allow a wide choice to obtain desired balance between screen strength and percent open area. If materials other than stainless steel are used to construct the screening surface, similar combinations may be employed to achieve desired opening size.

I RECOMMENDATIONS FOR CLEANING DRY MILK SIFTERS

I. DRY CLEANING PROGRAM

1. Completely dismantle and thoroughly vacuum or dry brush clean all product contact surfaces of the sifter. Reassemble as soon as finished and make every effort to keep all parts dry.

2. Check sifter screen(s) for broken or displaced wires (threads) and for other openings around the frame of the screen that might permit the passage of unsifted product. Other parts of the sifter, including ball trays and balls, if used, also should be inspected for condition. Any necessary repair or replacement should be made as soon as possible.

3. Flexible rubber or cloth connectors at the inlet and outlets of the sifter should be thoroughly cleaned, following procedures recommended for the sifter. Connectors should be closely examined for holes, cracks or other damage. (To facilitate removal for cleaning, use of easily removable fastening devices is recommended.)

4. Thoroughly vacuum or dry brush clean all external parts of the sifter, including the sifter frame and drive mechanism.

II. WET CLEANING PROGRAM

1. Completely dismantle, remove all loose dry product, then rinse all parts with clear water and follow with a thorough hand brushing of all parts using a general purpose cleaner. Rinse thoroughly to remove all cleaning solution or soil. It is recommended that hot water (170° F (76.7° C) or above) be used for rinsing in order to sanitize the equipment and to promote drying. Allow all parts to air dry completely prior to reassembly. Wet washing should be done as frequently as necessary, and may be done after each use if the sifter is not being used on a continuous basis.

   After cleaning, drying and reassembly, all openings should be protected against recontamination.

III. GENERAL

1. Vacuum cleaning is preferred to brush cleaning or cleaning with air under pressure as it decreases dust drift to other areas of the plant.

2. Brushes or vacuum cleaner fittings used for cleaning product contact surfaces should not be used for cleaning nonproduct contact surfaces or for other uses which might result in contamination. Such brushes and special fittings should be stored in enclosed cabinet when not in use. (For protection and housekeeping considerations, such cabinets preferably should be of nonwood construction and should have open mesh metal shelving.)

J O-RING GROOVE RADII

TABLE 4 — Minimum Groove Radii Dimensions For Standard O-Rings

O-Ring Cross Section, Nominal (AS 568[8])	O-Ring Cross Section, Actual (AS 568[8])	O-Ring Cross Section, Actual (ISO 3601-1[9])	Minimum Groove Radius
1/16 in.	0.070 in.	1.80 mm	0.016 in. (0.406 mm)
3/32 in.	0.103 in.	2.65 mm	0.031 in. (0.787 mm)
1/8 in.	0.139 in.	3.55 mm	0.031 in. (0.787 mm)
3/16 in.	0.210 in.	5.30 mm	0.062 in. (1.575 mm)
1/4 in.	0.275 in.	7.00 mm	0.094 in. (2.388 mm)

K ENGINEERING DESIGN AND TECHNICAL CONSTRUCTION FILE

The following is an example of an engineering design and technical construction file (EDTCF) to be maintained by the fabricator as evidence of complying with 3-A Sanitary Standards or 3-A Accepted Practices. (The file may contain more or less information as applicable to the equipment or system.)

K1 Purpose

K1.1 To establish and document the material, fabrication, and installation (where appropriate) requirements for the engineering design and technical construction files for all products, assemblies, and sub-assemblies supplied by the manufacturer thereof to be in compliance with the sanitary criteria found in 3-A Sanitary Standards or 3-A Accepted Practices. It is recommended that the engineering and construction file or files be submitted with applications for 3-A Symbol use authorization.

K2 Scope

K2.1 This EDTCF applies to equipment specified by:

K2.1.1 3-A Sanitary Standards for **{full title}**, Number **{document number}**.

K2.1.2 3-A Accepted Practices for **{full title}**, Number **{document number}**.

K2.1.3 List all applicable 3-A Sanitary Standards and 3-A Accepted Practices.

K3 Responsibilities

K3.1 This EDTCF is maintained by: The Engineering Manager (or other company official) **{name and title of responsible official}** is responsible for maintaining, publishing, and distributing this EDTCF.

K3.2 Implementation: All divisions, specifically development engineering, standards engineering, sales engineering, and product departments are responsible for implementing this EDTCF.

[8]The document establishing these standard dimensions is Aerospace Standard (AS) 568, published by SAE, 400 Commonwealth Drive, Warrendale, PA 15086 (412-776-4970).

[9]The document establishing these standard dimensions is ISO 3601-1; published by the International Organization for Standardization (ISO), 1 Rue de Varembe, Case Postale 58, CH 1 1211, Geneva, Switzerland (41-22-734-1240).

K4 **Applicability**

K4.1 The 3-A Sanitary Standards and 3-A Accepted Practices are voluntarily applied as suitable sanitary criteria for dairy and food processing equipment. 3-A Sanitary Standards are referenced in the Grade A Pasteurized Milk Ordinance: "Equipment manufactured in conformity with 3-A Sanitary Standards complies with the sanitary design and construction standards of this Ordinance."

K5 **References**

K5.1 List any additional regulations that apply to the equipment or system covered by this EDTCF.

K5.2 Date of conformity or 3-A Symbol Authorization and certificate number, if authorized.

K6 **Design and Technical Construction File**

K6.1 The Engineering Design and Technical Construction File may consist of the following:

a. an overall drawing of the subject equipment;
b. full detailed drawings, accompanied by any calculations, notes, test results, etc. required to check the conformity of the equipment with the 3-A Standards or 3-A Practices;
c. a list of:
   (1) the essential requirements of the standards or practices;
   (2) other technical specifications, which were used when the equipment was designed;
d. a description of methods adopted;
e. if essential, any technical report or certificate obtained from a competent testing body or laboratory;
f. any technical report giving the results of tests carried out internally by Engineering or others;
g. documentation and test reports on any research or tests on components, assemblies and/or the complete product to determine and demonstrate that by its design and construction the product is capable of being installed, put into service, and operated in a sanitary manner (optional);
h. a determination of the foreseeable lifetime of the product (optional);
i. a copy of the instructions for the product (Instruction Manuals/Instruction Books);
j. for serial manufacturing, the internal measures that will be implemented to insure that the equipment will continue to be manufactured in conformity with the provisions of the 3-A Sanitary Standards or 3-A Accepted Practices;
k. engineering reports;
l. laboratory reports;
m. bills of material;
n. wiring diagrams, if applicable;
o. sales order engineering files;
p. hazard evaluation committee reports, if executed;
q. change records;
r. customer specifications;
s. any notified body technical reports and certification tests;
t. copy of the 3-A Symbol authorization, if applicable.

K6.2 The file does not have to include detailed plans or any other specific information regarding the sub-assemblies, tooling, or fixtures used for the manufacture of the product unless a knowledge of them is essential for verification of conformity with the basic sanitary requirements found in 3-A documents.

K6.3 The documentation referred to in K6.1 above need not permanently exist in a material manner in the EDTCF, but it must be possible to assemble them and make them available within a period of time commensurate with its importance (one week is considered reasonable time). As a minimum, each product EDTCF must physically contain an index of the applicable document of K6.1 above.

K6.4 The EDTCF may be in hard copy or software form.

K7 **Confidentiality**

K7.1 The EDTCF is the property of the manufacturer and is shown at their discretion, except that all or part of this file will be available to the 3-A Symbol Council or a regulatory agency for cause and upon request.

K8 **File Location**

K8.1 The EDTCF shall be maintained at **{location}**.

K9 **File Retention**

K9.1 The EDTCF (including all documentation referred to in K6.1) shall be retained and kept available for 12 years following the date of placing the product in use or from the last unit produced in the case of series manufacture.

These standards are effective November 20, 2001.

Dairy, Food and Environmental Sanitation, Vol. 22, No. 1, Pages 76-80

3-A® Sanitary Standards for Diaphragm Pumps, Number 44-03

Formulated by
International Association of Food Industry Suppliers (IAFIS)
International Association for Food Protection (IAFP)
United States Public Health Service (USPHS)
The Dairy Industry Committee (DIC)
United States Department of Agriculture – Dairy Programs (USDA)

It is the purpose of the IAFIS, IAFP, USPHS, DIC, and USDA in connection with the development of the 3-A Sanitary Standards Program to allow and encourage full freedom for inventive genius or new developments. Diaphragm pump specifications heretofore or hereafter developed which so differ in design, materials, and fabrication or otherwise as not to conform to the following standards but which, in the fabricator's opinion, are equivalent or better, may be submitted for the joint consideration of the IAFIS, IAFP, USPHS, DIC, and USDA at any time. The 3-A Sanitary Standards and 3-A Accepted Practices provide hygienic criteria applicable to equipment and systems used to produce, process, and package milk, milk products, and other perishable foods or comestible products. Standard English is the official language of 3-A Sanitary Standards and 3-A Accepted Practices.

A **SCOPE**

A1 These standards cover the sanitary aspects of air, hydraulically, or mechanically driven diaphragm pumps for milk and milk products.

A2 In order to conform to these 3-A Sanitary Standards, diaphragm pumps shall comply with the following design, material, and fabrication criteria.[1]

B **DEFINITIONS**

B1 *Product:* Shall mean milk, milk products, and other comestibles.

B2 **Surfaces**

B2.1 *Product Contact Surfaces:* Shall mean all surfaces which are exposed to the product and surfaces from which liquids may drain, drop, diffuse, or be drawn into the product.

B2.2 *Nonproduct Contact Surfaces:* Shall mean all other exposed surfaces.

B3 *Mechanical Cleaning or Mechanically Cleaned:* Shall denote cleaning, solely by circulation and/or flowing chemical detergent solutions and water rinses onto and over the surfaces to be cleaned, by mechanical means.

B4 *Air Driven-Type Pumps:* Shall mean those that apply compressed air directly to the nonproduct side of the diaphragm for the purpose of driving the pump.

B5 *Hydraulically Driven-Type Pumps:* Shall mean those that apply hydraulic fluid directly to the nonproduct side of the diaphragm for the purpose of driving the pump.

B6 *Mechanically Driven-Type Pumps:* Shall mean those that have the nonproduct side of the diaphragm open to the atmosphere at all times and use a mechanical shaft directly connected to the diaphragm for the purpose of driving the pump.

[1]Use current revisions or editions of all referenced documents cited herein.

C MATERIALS

C1 All product contact surfaces shall be of stainless steel of the AISI 300 Series[2] or corresponding ACI types[3] (See Appendix, Section E), or metal which under conditions of intended use is at least as corrosion resistant as stainless steel of the foregoing types, and is nontoxic and nonabsorbent, except that:

C1.1 Rubber and rubber-like materials may be used for O-rings, seals, diaphragms, valve seats, check valve balls and flaps, and parts having the same functional purposes.

C1.2 Rubber and rubber-like materials, when used for specified applications, shall comply with the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Rubber and Rubber-Like Materials Used as Product Contact Surfaces in Dairy Equipment, Number 18-.

C1.3 Plastic materials may be used for O-rings, seals, diaphragms, valve seats, check valve balls and flaps, and parts having the same functional purposes.

C1.4 Plastic materials, when used for specified applications, shall comply with the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Number 20-.

C1.5 Bonded rubber and rubber-like materials and bonded plastic materials having product contact surfaces shall be of such composition as to retain their surface and conformation characteristics when exposed to conditions encountered in the environment of intended use and in cleaning and bactericidal treatment, or sterilization.

C1.6 The final bond and residual adhesive, if used, of bonded rubber and rubber-like materials and bonded plastic materials shall be nontoxic.[4]

C1.7 Check valve balls may also be of hard rubber (a vulcanized rubber having a ratio of combined sulfur to rubber hydrocarbon in excess of 15% and a Shore A Durometer value in excess of 90) that is nontoxic and relatively resistant to abrasion, will maintain its original characteristics, such as form, shape, and dimensions, and will not affect the product and shall, when subjected to the test regimen set forth in the 3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Number 20-, (a) comply with the criteria in Section I (1) and Section I (3), (b) have maximum weight gains as set forth in Section I (2) of 0.30 and in the Cleanability Response, 0.30 in Product Treatment with Solution I and 0.30 in Product Treatment with Solution J.

C1.8 Where materials having certain inherent functional purposes are required for specific applications, such as check valve balls, solid ceramic materials may be used. Ceramic materials shall be inert, nonporous, nontoxic, nonabsorbent, insoluble, resistant to scratching, scoring, and distortion when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment or sterilization.

C2 Nonproduct contact surfaces shall be of corrosion-resistant material or material that is rendered corrosion resistant. If coated, the coating used shall adhere. Nonproduct contact surfaces shall be relatively nonabsorbent, durable, and cleanable. Parts removable for cleaning having both product contact and nonproduct contact surfaces shall not be painted.

C3 In hydraulically driven diaphragm pumps, the hydraulic fluid used shall be food grade white oil as provided for in 21 CFR Parts 172.878 and 178.3620A.

C3 Sterilizability

C3.1 In a processing system to be sterilized by heat and operated at a temperature of 250°F (121°C) or higher, all materials having product contact surface(s) used in the construction of diaphragm pumps and nonmetallic component parts shall be such that they can be (1) sterilized by saturated steam or water under pressure (at least 15.3 psig or 106 kPa) at a temperature of at least 250°F (121°C) and (2) operated at the temperature required for processing.

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[2]The data for this series are contained in the *AISI Steel Products Manual, Stainless & Heat Resisting Steels*, Table 2-1. Available from the American Iron and Steel Society, 186 Thorn Hill Road, Warrendale, PA 15086 (724) 776-1535.

[3]Steel Founders Society of America, Cast Metal Federation Building, 455 State Street, Des Plaines, IL 60016 (708) 299-9160.

[4]Adhesives shall comply with 21 CFR 175 - Indirect Food Additives: Adhesives and Components of Coatings. Document for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (202) 783-3238.

D FABRICATION

D1 All product contact surfaces shall have a finish at least as smooth as a No. 4 ground finish on stainless steel sheets and be free of imperfections such as pits, folds, and crevices in the final fabricated form. (See Appendix, Section F.)

D2 All permanent joints in metallic product contact surfaces shall be continuously welded. Welded areas on product contact surfaces shall be at least as smooth as a No. 4 ground finish on stainless steel sheets and be free of imperfections such as pits, folds, and crevices in the final fabricated form.

D3 Rubber or rubber-like materials, hard (vulcanized) rubber, and plastic materials having product contact surfaces that are a coating or covering shall be bonded in such a manner that the bond is continuous and mechanically sound, and so that when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment, or sterilization, the rubber and rubber-like material, hard (vulcanized) rubber, or the plastic material does not separate from the base material to which it is bonded. The final bond and residual adhesive, if used, shall conform to the criteria in C1.6.

D4 Pumps that are to be mechanically cleaned shall be designed so that all product contact surfaces of the pump and all nonremovable appurtenances thereto can be mechanically cleaned and are readily accessible for inspection.

D4.1 All product contact surfaces not designed to be mechanically cleaned shall be easily accessible for cleaning and inspection either when in an assembled position or when removed. Removable parts shall be readily demountable.

D5 There shall be no threads on product contact surfaces.

D6 Gaskets having product contact surfaces shall be removable. Any gasket groove of gasket retaining groove shall not exceed 1/4 in. (6.35 mm) in depth or be less than 1/4 in. (6.35 mm) wide except those for standard O-rings smaller than 1/4 in. (6.35 mm), and those provided for fittings in Section D8.

D7 All internal angles of less than 135° on product contact surfaces shall have minimum radii of 1/4 in. (6.35 mm), except that:

D7.1 Smaller radii may be used when they are required for essential functional reasons, such as those in molded diaphragms. In no case shall such radii be less than 1/32 in. (0.794 mm).

D7.2 The minimum radii in grooves in gaskets or gasket retaining grooves shall not be less than 1/2 in. (12.7 mm), except those for standard 1/4 in. (6.35 mm) and smaller O-rings and those provided for fittings in Section D8.

D7.3 The minimum radii in grooves for standard 1/4 in. (6.35 mm) O-rings shall be not less than 3/32 in. (2.38 mm) and for standard 1/2 in. (12.7 mm) O-rings shall be not less than 1/32 in. (0.794 mm).

D7.4 When a flat diaphragm is in its neutral position, the angle formed between the diaphragm and the wall of the chamber at the clamping point on the product side shall be not less than 90°.

D7.5 A tubular diaphragm design shall provide a straight through flow path void of any cracks or crevices.

D7.6 When a flat diaphragm is in its neutral position, the angle formed between the diaphragm and the rod attachment, at the clamping point on the product side, shall be not less than 90°. This requirement pertaining to the clamping point is not applicable if the rod attachment is completely encapsulated by the diaphragm material.

D7.7 The clamping point(s) on the flat or tubular diaphragm shall be designed so that there is effective liquid sealing at the clamping point, regardless of the pumping stroke position of the diaphragm.

D8 Inlet and outlet connections shall conform to the applicable provisions of the current 3-A Sanitary Standards for Sanitary Fittings for Milk and Milk Products, Number 63-.

D9 **Leak Detection**

D9.1 The chamber on the nonproduct side of a mechanically driven diaphragm pump shall have one or more 1/2 in. (12.7 mm) unobstructed openings to the atmosphere, located so one hole will be at the lowest point for detection of leakage, except that:

D9.1.1 The unobstructed opening is not necessary if a leak detection system complying with D9.2, D9.4, and D9.5 is provided.

D9.2 The chamber(s) on the nonproduct side(s) of a mechanically driven diaphragm pump, equipped with a leak detection system in lieu of unobstructed openings, shall be provided with a means of detecting a leak in the diaphragm. A deteetion system capable of sensing the presence of liquid and stopping the pump shall be installed in the nonproduct chamber(s) of the pump.

D9.3 Hydraulically driven diaphragm pumps shall be equipped with diaphragms to provide a double barrier between the product and the hydraulic system, and shall include a leak detection device to reliable sense rupture of either diaphragm. The space between the two diaphragms shall be equipped with a pressure-activated switch or conductivity probe to immediately signal diaphragm rupture by contact closure and to stop the pump motor.

D9.4 The manufacturer shall provide a failsafe leak detection system which will make the pump stop whenever liquid is sensed on the nonproduct side of the diaphragm, or pressure rise or change in conductivity is sensed in the intermediate space or the leak detection system fails. This criterion is not required for mechanically driven diaphragm pumps which are provided with properly positioned openings for the detection of leakage as specified in D9.1.

D9.5 The leak detection apparatus shall be easily tested independently, or verified on the pump while the pump is in operation. One test method for pneumatic pumps is to submerge the detector probe(s) in a conductive fluid such as water to determine that the dump does stop. In the case of a hydraulically-driven diaphragm pump, pressure can be applied to the monitoring chamber via the hose barb to test the pressure-activated switch for shutdown signal or the conductivity probe apparatus may be tested independently via a test switch on the probe. This criterion is not required for mechanically driven diaphragm pumps which are provided with properly positioned openings for the detection of leakage as specified in D9.1.

D10 The pump shall be drainable when disassembled for manual cleaning and/or inspection.

D11 The means of supporting pumps shall be one of the following:

D11.1 Legs, when used, shall be smooth, adjustable or fixed with rounded ends or have flat load-bearing feet suitable for mounting to the floor and have no exposed threads. Legs made of hollow stock shall be sealed. Legs shall be of sufficient length to provide a clearance between the lowest part of the base, pump, motor, or drive and the floor of no less than:

D11.1.1 Four in. (100 mm) on pumps with legs designed to be permanently mounted or fixed to the floor or pumps having a horizontal base area of more than 1 ft^2 (0.09 m^2) or;

D11.1.2 Two in. (5 cm) on pumps having a horizontal base area of not more than 1 ft^2 (0.09 m^2) and not designed to be fixed to the floor.

D11.2 If mounted on a wall or column, the point of attachment of a diaphragm pump to its mounting shall be designed for sealing. The mounting, if supplied by the manufacturer, shall be designed for sealing to the wall or column. The design of a diaphragm pump to be mounted on a wall or column shall be such that there will be at least a 4 in. (100 mm) clearance between the outside of the diaphragm pump and the wall or column.

D12 Any guard(s) required by a safety standard that will not permit accessibility for cleaning and inspection shall be designed so that it (they) can be removed without the use of tools.

D13 Nonproduct contact surfaces shall be relatively smooth, free of pockets and crevices, and be readily cleanable. Those to be coated shall be effectively prepared for coating.

D14 **Sterilization Systems**

D14.1 Diaphragm pumps used in a processing system to be sterilized by heat and operated at a temperature of 250°F (121°C) or higher shall comply with the following additional criteria:

D14.2 The construction shall be such that all product contact surfaces can be (1) sterilized by saturated steam or water under pressure (at least 15.3 psig or 106 kPa) at a temperature of at least 250°F (121°C) and (2) operated at the temperature required for processing.

D14.3 Diaphragm pumps that have a product contact surface(s) to be used in such a processing system, not designed so that the system is automatically shut down if the product pressure in the system becomes less than that of the atmosphere and cannot be restarted until the system is re-sterilized, shall have a steam or other sterilizing medium chamber surrounding the (1) nonproduct side of the diaphragm, (2) the portion of the inlet and outlet connection adjacent to the product, and (3) the pump cover at the product contact surface if required to maintain sterility. The diaphragm pumps shall be constructed so that the steam chamber or other sterilizing medium chamber may be exposed for inspection.

D14.4 Where steam or other sterilizing medium is used, the connection(s) on the diaphragm pumps shall be such that the steam lines or other sterilizing medium lines can be securely fastened to the diaphragm

pumps. The diaphragm pumps shall be constructed so that the steam or other sterilizing medium chamber may be exposed for inspection.

D14.5 The seal(s) in a diaphragm pumps designed to be used in a processing system to be sterilized by heat and operated at a temperature of 250°F (121°C) or higher shall be between the product contact surface and the steam or other sterilizing chamber.

APPENDIX

E **STAINLESS STEEL MATERIALS**

Stainless steel conforming to the applicable composition ranges established by AISI for wrought products, or by ACI for cast products, should be considered in compliance with the requirements of Section C1 herein. Where welding is involved, the carbon content of the stainless steel should not exceed 0.08%. The first reference cited in C1 sets forth the chemical ranges and limits of acceptable stainless steel of the 300 Series. Cast grades of stainless steel corresponding to types 303, 304, and 316 are designated CF-16F, CF-8, and CF-8M, respectively. The chemical compositions of these cast grades are covered by ASTM specifications[5] A351/A351M, A743/A743M and A744/A744M.

F **PRODUCT CONTACT SURFACE FINISH**

Surface finish equivalent to 150 grit or better as obtained with silicon carbide, properly applied on stainless steel sheets, considered in compliance with the requirements of Section D1 herein. A maximum R_a of 32 in. (0.80 µm), when measured according to the recommendations in American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME)[6] B46.1 – *Surface Texture*, is considered to be equivalent to a No. 4 finish.

These amended standards are effective November 20, 2001.

[5]Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. Phone: (610) 832-9500.

[6]Available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017-2392 (212) 705-7722.

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·**6-7, Sensory Evaluation: Real World Techniques and Applications,** Rutgers University, New Brunswick, NJ. For further information, contact Keith Wilson at 732.932.9271; E-mail: ocpe@aerp.rutgers.edu.

·**7-8, ASI Food Safety Consultants Lead Auditor Seminar,** Embassy Suites, St. Louis, MO. For further information, contact Andrea Lewis at 800.477.0778 ext. 308.

·**15-18, United 2002,** Orange County Convention Center, Orlando FL. For further information, call 800.934.1957; Web site: www.uffva.org

·**18-20, ABC Research Corp. Annual Technical Seminar,** Gainesville, FL. For further information, call 352.372.0436.

·**19, Georgia Association of Food and Environmental Sanitarians Annual Meeting,** Radisson Hotel, Atlanta, GA. For further information, contact Robert Brooks at 770.536.5909.

·**19, HACCP: A Management Summary,** Guelph Food Technology Center, Guelph, Ontario. For further information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.

·**19-21, Kentucky Association of Dairy, Food and Environmental Specialists Annual Meeting,** Executive West Hotel, Louisville, KY. For further information, contact David Burton at 270.781.8039.

·**20-21, California Association of Dairy and Milk Sanitarians Annual Meeting,** Holiday Inn, Visalia, CA. For further information, contact John Bruhn at 530.752.2192.

·**20-22, IFT's International Food Safety and Quality Expo,** Atlanta Marriott Marquis, Atlanta, GA. For further information, call 312.782.8424; E-mail: ift@ift.org.

MARCH

·**7, Controlling *Listeria* in Your Plant,** Nashville, TN. For further information, call Silliker Laboratories at 800.829.7879.

·**7-10, Meat and Poultry Industry Council Annual Conference,** Sheraton Hacienda del Mar Resort and Spa, Cabo del Sol, Mexico. For further information, contact Cheryl Clark at 703.684.1080.

·**13-15, Idaho Environmental Health Association Spring Conference,** West Coast Park Center Suites, Boise, ID. For further information, contact Angela Markham at 208.239.5231.

·**14-15, Carolinas Association for Food Protection Annual Meeting,** Holiday Inn, Charlotte. For further information, contact Beth Johnson at 803.896.0872.

·**14-17, Association of Water Technologies (AWT) Regional Training Seminar East,** The Holiday Inn Inner Harbor, Baltimore, MD. For more information, call AWT 800.858.6683.

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APRIL

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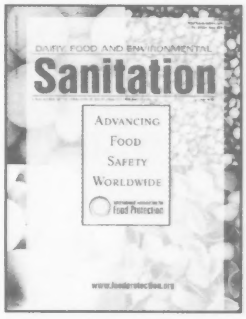

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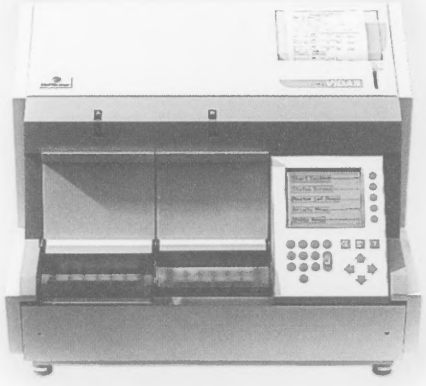

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