

DECEMBER 1996 • VOL. 16 • NO. 12 • PAGES 797-884

ISSN: 1043-3546

6200 Aurora Avenue • Suite 200W
Des Moines, Iowa • USA • 50322

DAIRY, FOOD AND ENVIRONMENTAL

Sanitation

A PUBLICATION OF THE INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, INC. DECEMBER 1996

- **Affiliate News**
- **Index to Volume 16**
- **3-A Sanitary Standards**

Please circle # 147
on your Reader Service card

Will They Pass The Delvotest?



Losing milk to antibiotic contamination can be just as costly to your operation as to that of the farmers who supply you. That's why we developed Delvotest, a simple, reliable test to detect antibiotic residues in milk before they can

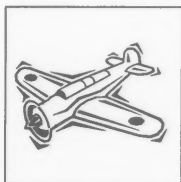
contaminate your dairy farmers' bulk tanks. Standardized and self-contained, Delvotest quickly and accurately detects the presence of Beta Lactam and most other

Gist-brocades

veterinary antibiotics. Delvotest is easy to use and, at about a dollar a test, extremely economical for large- and small-scale operations. So encourage your dairy farmers to take the Delvotest. They'll pass a safer product on to you.

N93 W114560 WHITTAKER WAY, MENOMONEE FALLS, WI 53051, 800-423-7906, FAX 414-255-7732

We don't care *how* you get it here...



but we do care *if* we get it!

Affiliates are an important part of IAMFES, and that's why we need you, our Affiliate Associations and Affiliate Members, to let us know what is going on in your organizations. Keep us abreast of meetings, activities, seminars and other events by sending us min-

utes, announcements or just a quick update. In return, we'll publish it in our next issue of *Dairy, Food and Environmental Sanitation*. All we ask is that you please send information regarding upcoming events at least two months in advance.

Please address to: Managing Editor, *Dairy, Food and Environmental Sanitation*,
6200 Aurora Avenue, Suite 200W, Des Moines, Iowa 50322-2863, Telephone (515) 276-3344 or Fax: (515) 276-8655.

Our Affiliates Count!

ABOUT THE COVER...

Photo courtesy of Aquionics, Inc.
A maintenance time-saver, the automatic wiper mechanism cleans the quartz sleeve of Aquionics' ultraviolet system.

DAIRY, FOOD AND ENVIRONMENTAL

Sanitation

A PUBLICATION OF THE INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, INC.

ARTICLES

- Consumer Response to the Use of Lasers in Food Processing** 810
Christine M. Bruhn, Howard G. Schutz, Margaret C. Johns, Cathi Lamp, Gwendolyn Stanford, Yvonne J. Steinbring, and Dana Wong
- Regulatory Responsibility within the U.S. Dairy Industry** 817
Thomas M. Gilmore
- Bulk Starter Media for Mesophilic Starter Cultures: A Review** 823
S. A. Ibrahim and M. H. Daguri
- A Book Review: Food Allergies and Intolerances** 830
Edited by: Gerhard Eisenbrand, Holger Aulepp, Anthony David Dayan, Peter Stefan Elias, Werner Grunow, Johannes Ring and Josef Schlatter

ASSOCIATION NEWS

- Sustaining Members 803
- Off the Top From the President 806
- Perspectives From the Executive Director 808
- New IAMFES Members 832
- IAMFES Affiliate Officers 833

DEPARTMENTS

- Updates 836
- News 839
- Affiliate News 842
- Industry Products 843
- Business Exchange 847
- Advertising Index 877
- Coming Events 879

EXTRAS

- 1997 Call for Awards 829
- 3-A Sanitary Standard Amendments No. 09-09, and 37-01 850
- 3-A Sanitary Standards No. 68-00, 20-18, and 606-04 851
- Index to Volume 16 873
- IAMFES Financial Report 878
- IAMFES Booklet Form 882
- IAMFES Membership Application 884

The publishers do not warrant, either expressly or by implication, the factual accuracy of the articles or descriptions herein, nor do they so warrant any views or opinions offered by the authors of said articles and descriptions.

The Power to See **Bacteria** As You've Never Seen Them Before. And We Put It on Your Lab Bench.



The RiboPrinter™ System is one of a kind.

The RiboPrinter™ Microbial Characterization System *automatically* produces a genetic fingerprint of a bacterium in less than eight hours. This "molecular typing lab in a box" from Qualicon™ gives you reliable, reproducible information about your microbial environment. So you can explore epidemiology, monitor manufacturing processes and target decontamination activities with unprecedented ease.

Qualicon™ is changing the way microbiology is done.

Qualicon™, a subsidiary of the DuPont Company, is creating new ways to meet your microbial quality and safety needs. We're putting the power of advanced genetics-based technology in your hands.

Let us help you streamline your operations by providing better quality information faster and more conveniently than ever before. To learn more or to send samples to the Qualicon™ Molecular Typing Lab,

Call us at
1-800-863-6842.



Why settle for
just a



when you
could have
the whole



Receiving monthly issues of *Dairy, Food and Environmental Sanitation* is just one of the many benefits of being a member of the International Association of Milk, Food and Environmental Sanitarians.

To find out what you've been missing and how you can join IAMFES, please contact: Julie Cattanach, Membership Coordinator, IAMFES, 6200 Aurora Avenue, Suite 200W, Des Moines, Iowa 50322-2863; telephone (515) 276-3344 or (800) 369-6337; fax (515) 276-8655.

DAIRY, FOOD AND ENVIRONMENTAL

Sanitation

A PUBLICATION OF THE INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, INC.

Dairy, Food and Environmental Sanitation (ISSN-1043-3546) is published monthly beginning with the January number by the International Association of Milk, Food and Environmental Sanitarians, Inc. Each volume comprises 12 numbers. Printed by Heuss Printing, Inc., 911 N. Second Street, Ames, IA 50010, USA. Periodical Postage paid at Des Moines, IA 50318 and additional entry offices.

Postmaster: Send address changes to **Dairy, Food and Environmental Sanitation**, 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2863, USA.

IAMFES, Inc., Mailing Address: 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2863, USA.

Manuscripts: Correspondence regarding manuscripts should be addressed to Carol F. Mouchko, Managing Editor, IAMFES, Inc.

News Releases, Updates, Coming Events and Cover Photos: Correspondence for these materials should be sent to Donno A. Bohun, Publications Specialist, IAMFES, Inc.

"Instructions to Contributors" may be obtained from Michelle Sproul, Publications Assistant, IAMFES, Inc.

Orders for Reprints: All orders should be sent to **Dairy, Food and Environmental Sanitation**, IAMFES, Inc. Note: Single copies of reprints are not available from this address; address single copy reprint requests to principal author.

Reprint Permission: Questions regarding permission to reprint any portion of **Dairy, Food and Environmental Sanitation** should be addressed to: Managing Editor, IAMFES, Inc.

Business Matters: Correspondence regarding business matters should be addressed to David W. Thorp, Director of Finance and Administration, IAMFES, Inc.

Membership Dues: Membership in the Association is available to individuals. Dues are \$75.00 per year and include a subscription to **Dairy, Food and Environmental Sanitation**. Dues including both **Dairy, Food and Environmental Sanitation** and **Journal of Food Protection** are \$120.00. Student membership is \$37.50 per year, with verification of student status, and includes **Dairy, Food and Environmental Sanitation** or **Journal of Food Protection**. Student membership with both journals is \$60.00. No cancellations accepted.

Sustaining Membership: A sustaining membership in IAMFES is available to companies at a rate of \$485.00 per year. For more information, contact Rick McAtee, Advertising/Exhibits Manager, IAMFES, Inc.

Subscription Rates: \$140.00 per year. Single copies \$21.00 each. No cancellations accepted. For more information, contact Julie A. Cottonoch, Membership/Meeting Coordinator, IAMFES, Inc.

Postage: Outside U.S. add \$22.50 per journal (*DFES* or *JFP*) for surface delivery; add \$95.00 per journal (*DFES* or *JFP*) for air mail delivery. U.S. FUNDS ONLY - ON U.S. BANK. Single copies add \$9.00 per issue.

Claims: Notice of failure to receive copies must be reported within 30 days domestic, 90 days outside U.S. Correspondence regarding changes of address and dues must be sent to Julie A. Cottonoch, Membership/Meeting Coordinator, IAMFES, Inc.



The Standard In Food Safety Training

People count on you to set guidelines and maintain standards for the serving of safe food. So doesn't it make sense to train foodservice personnel with a program that has certified over 500,000 foodservice managers and trained an additional 1,000,000 front-line employees?

SERVSAFE® Serving Safe Food training, from The Educational Foundation of the National Restaurant Association, is a food safety educational system that provides training and certification specific to the job responsibilities of foodservice managers and employees. The principles covered in SERVSAFE are designed to address critical food safety issues based on the Hazard Analysis Critical Control Point (HACCP) system.

SERVSAFE includes videos and texts, plus interactive techniques to make learning both efficient and highly effective.

Regulatory and industry food safety professionals recognize the benefits of this educational system and have enhanced their knowledge of the HACCP approach to implementing a food safety management system. Clear, precise, and up-to-date, SERVSAFE includes videos and texts,

plus interactive techniques to make learning both efficient and highly effective.

The Educational Foundation and the U.S. Food and Drug Administration's State Training Branch

are currently conducting several cooperative training workshops to provide regulatory and industry professionals with an understanding of the principles of HACCP and their practical application within any type of foodservice operation.

For more information on our HACCP-based SERVSAFE system, or on how to arrange a training seminar on Managing a Food Safety System, call 1-800-765-2122, ext. 369.

National Restaurant Association

THE EDUCATIONAL FOUNDATION 

SCIENTIFIC EDITOR

William LaGrange, Ph.D.
Iowa State University
Department of Food Science
and Human Nutrition
Food Sciences Building
Ames, IA 50011-0001
(515) 294-3156; fax (515) 294-8181
e-mail: foodsci@exnet.isu.edu

IAMFES STAFF

Executive Director
David M. Merrifield

Director of Finance & Administration
David W. Tharp

Accounting Assistant
Bryan Ladd

Managing Editor
Carol F. Mouchka

Publications Specialist
Donna A. Bahun

Publications Assistant
Michelle L. Sproul

Publication Proofreader
Pam Wanninger

Advertising/Exhibit Manager
Rick McAtee

Membership/Meeting Coordinator
Julie A. Cattanach

Advertising/Exhibit Account Executive
Darci Davenport

Lending Library Coordinator
Tanya Smith

Order Fulfillment/Receptionist
Karla Jordan

COVER PHOTOS

Send your photographs to be considered for publication on the cover of *Dairy, Food and Environmental Sanitation* to:

Donna Bahun, Publications Specialist
IAMFES
6200 Aurora Ave., Suite 200W
Des Moines, IA 50322-2863

Photos will be returned when requested.

DAIRY, FOOD AND ENVIRONMENTAL

Sanitation

IAMFES EXECUTIVE BOARD

President, Michael H. Brodsky, Ontario Ministry of Health, P.O. Box 9000, Terminal A, Toronto, Ontario, Canada M5W 1R5; phone (416) 235-5717; e-mail: bradskm@gov.on.ca

President-Elect, Gale Prince, The Kroger Co., 1014 Vine Street, Cincinnati, OH 45202-1100; phone (513) 762-4209; e-mail: gprince@kroger.com

Vice President, Robert E. Brackett, University of Georgia, Center for Food Safety and Quality Enhancement, GA Experiment Station, Griffin, GA 30223-1797; phone (770) 412-4735; e-mail: rbracke@cfsqe.griffin.peachnet.edu

Secretary, Jack Guzewich, New York State Department of Health, Bureau of Community Sanitation and Food Protection, 2 University Place, Room 404, Albany, NY 12203-3399; phone (518) 458-6714; e-mail: jjg01@health.state.ny.us

Past President, F. Ann Draughon, University of Tennessee, Food Science and Technology Department, P.O. Box 1071, Knoxville, TN 37901-1071; phone (423) 974-7425; e-mail: draughon@utk.edu

Affiliate Council Chair, John C. Bruhn, University of California-Davis, Department of Food Science and Technology, 101 Cruess Hall, Davis, CA 95616-8598; phone (916) 752-2192; e-mail: jcb Bruhn@ucdavis.edu

EXECUTIVE DIRECTOR

David M. Merrifield, 6200 Aurora Ave., Suite 200W, Des Moines, IA 50322-2863; phone (515) 276-3344; e-mail: iamfesed@dwx.com

EDITORIAL BOARD

SIDNEY BARNARD	University Park, PA
HAROLD BENGSCHE	Springfield, MO
FLOYD W. BODYFELT	Corvallis, OR
JOHN C. BRUHN	Davis, CA
J.H. BURKETT	Sioux City, IA
WARREN S. CLARK, JR.	Chicago, IL
WILLIAM W. COLEMAN, II	St. Paul, MN
OLIVER D. COOK	Rockville, MD
NELSON COX	Athens, GA
RUTH G. FUGUA	Mt. Juliet, TN
THOMAS M. GILMORE	Rockville, MD
DAVID GOMBAS	Arlington Heights, IL
CHARLOTTE W. HINZ	Leroy, NY
RICHARD F. JOLLEY	Branford, CT
JAMES W. LITTLEFIELD	Austin, TX
PAUL F. MARTIN	Chicago, IL
JOHN R. MOLENDAS	Salisbury, MD
DEBBY L. NEWSLOW	Plymouth, FL
DARYL S. PAULSON	Bozeman, MT
DAVID H. PEPPER	Sioux City, IA
MICHAEL PULLEN	White Bear Lake, MN
J. REEDER	Reston, VA
ROBERT L. SANDERS	Pensacola, FL
P.C. VASAVADA	River Falls, WI

"The mission of IAMFES is to provide food safety professionals worldwide with a forum to exchange information on protecting the food supply."

Sustaining Members

3M Microbiology Products, 3M Center, Bldg. 275, St. Paul, MN 55144-1000; (612) 733-9558

ABC Research, 3437 S.W. 24th Avenue, Gainesville, FL 32607; (352) 372-0436

Accurate Metering Systems, Inc., 1651 Wilkening Road, Schaumburg, IL 60173; (708) 882-0690

Applied Research Institute, 8 Blanche's Walk, P.O. Box 810, Newtown, CT 06470; (800) 410-1988

APV Crepaco, 9525 W. Bryn Mawr Ave., Rosemont, IL 60018; (708) 678-4300

ASI Food Safety Consultants, Inc., 7625 Page Blvd., St. Louis, MO 63133; (314) 725-2555

Becton Dickinson Microbiology Systems, Inc., P.O. Box 243, Cockeysville, MD 21030; (410) 584-7188

Bentley Instruments, Inc., 4004 Peavey Road, Chaska, MN 55318; (612) 448-7600

BioControl Systems, Inc., 19805 N. Creek Parkway, Bothell, WA 98011; (206) 487-2055

Biolog, Inc., 3938 Trustway, Hayward, CA 94545; (510) 785-2585

bioMérieux Vitek, Inc., 595 Anglum Drive, Hazelwood, MO 63042-2395; (800) 638-4835

Bioscience International, Inc., 11607 Magruder Lane, Rockville, MD 20852-4365; (301) 230-0072

Capitol Vial, Inc., P.O. Box 446, Fultonville, NY 12072; (518) 853-3377

Celsis, Inc., 1801 Maple Ave., BIRL Bldg., Evanston, IL 60201; (847) 467-6600

Charm Sciences, Inc., 36 Franklin Street, Malden, MA 02148; (617) 322-1523

Copesan Services, Inc., 3490 N. 127th St., Brookfield, WI 53005; (800) 267-3726

Dairy and Food Labs, Inc., 3401 Crow Canyon Road, Suite 110, San Ramon, CA 94583-1307; (510) 830-0350

Dairy Quality Control Institute, 5205 Quincy Street, Mounds View, MN 55112-1400; (612) 785-0484

DARDEN Restaurants, P.O. Box 593330, Orlando, FL 32859-3330; (407) 245-5330

Darigold, Inc., 635 Elliott Ave., P.O. Box 79007, W. Seattle, WA 98119; (206) 286-6772

Dean Foods, P.O. Box 7005, Rockford, IL 61101-7005; (815) 962-0647

Decagon Devices, 950 N.E. Nelson Court, P.O. Box 835, Pullman, WA 99163; (509) 332-2756

Difco Laboratories, Inc., P.O. Box 331058, Detroit, MI 48232; (313) 462-8478

DonLevy & Associates, Inc., 1551 E. 89th Ave., Merrillville, IN 46410; (219) 736-0472

Dynal, Inc., 5 Delaware Drive, Lake Success, NY 11042; (516) 326-3270

Educational Foundation of the National Restaurant Assn., 250 S. Wacker Drive, Suite 1400, Chicago, IL 60606-3834; (800) 765-2122

Electrol Specialties Company, 441 Clark Street, South Beloit, IL 61080; (815) 389-2291

Evergreen Packaging, Division of International Paper, 2400 6th Street, S.W., Cedar Rapids, IA 52406; (319) 399-3236

F & H Food Equipment Co., P.O. Box 3985, Springfield, MO 65808; (417) 881-6114

Foss Food Technology Corporation, 10355 W. 70th Street, Eden Prairie, MN 55344; (612) 941-8870

FRM Chem, Inc., P.O. Box 207, Washington, MO 63090; (314) 583-4360

G&H Products Corp., 8201 104th Street, P.O. Box 909, Pleasant Prairie, WI 53158-0909; (414) 694-1010

Gardex Chemicals, Ltd., 7 Meridian Rd., Etobicoke, ON M9W 4Z6; (800) 563-4273

GENE-TRAK Systems, 94 South Street, Hopkinton, MA 01748; (508) 435-7400

Gist-brocades Dairy Ingredients Group, N93 W14560 Whittaker Way, Menomonee Falls, WI 53051; (800) 423-7906

Glo Germ Company, 1120 S. Highway 191, Moab, UT 84532; (800) 842-6622

Great Western Chemical Co., 1717 E. Fargo, Nampa, ID 83687; (208) 466-8437

Hardy Diagnostics, 1430 W. McCoy Ln., Santa Maria, CA 93455; (805) 346-2766

Hess & Clark, Inc./KenAg, 7th & Orange Street, Ashland, OH 44805; (800) 992-3594

IBA, Inc., 27 Providence Road, Millbury, MA 01527; (508) 865-6911

Idetek, Inc., 1245 Reamwood Ave., Sunnyvale, CA 94089; (408) 745-0544

IDEXX Laboratories, Inc., 1 Idexx Drive, Westbrook, ME 04092; (207) 856-0300

Sustaining Members

International BioProducts, Inc., 14780 N.E. 95th Street, Redmond, WA 98052; (206) 883-1349

International Dairy Foods Association, 1250 H Street, N.W., Suite 900, Washington, D.C. 20005; (202) 737-4332

Land O'Lakes, Inc., P.O. Box 116, Minneapolis, MN 55440-0116; (612) 481-2870

Malthus Diagnostics, Inc., 35888 Center Ridge Road, North Ridgeville, OH 44039; (216) 327-2585

Maryland & Virginia Milk Producers Assn., Inc., 1985 Isaac Newton Square, Reston, VA 20190; (703) 742-6800

Metz Sales, Inc., 522 W. First Street, Williamsburg, PA 16693; (814) 832-2907

Michelson Laboratories, Inc., 6280 Chalet Drive, Commerce, CA 90040; (310) 928-0553

Mid America Dairymen, Inc., 3253 E. Chestnut Expressway, Springfield, MO 65802-2584

NSF International, 3475 Plymouth Road, Ann Arbor, MI 48105; (313) 769-5523; (313) 769-0109

NASCO International, 901 Janesville Avenue, Fort Atkinson, WI 53538; (414) 563-2446

National Mastitis Council, 2820 Walton Commons West, Suite 131, Madison, WI 53704; (608) 224-0622

The National Food Laboratory, 6363 Clark Ave., Dublin, CA 94568; (510) 551-4231

Nelson-Jameson, Inc., 2400 E. Fifth Street, P.O. Box 647, Marshfield, WI 54449-0647; (715) 387-1151

NESTLÉ USA, Inc., 800 N. Brand Blvd., Glendale, CA 91203; (818) 549-5799

New Horizons Diagnostics, 9110 Red Branch Road, Columbia, MD 21045; (410) 992-9357

Northland Laboratories, 1810 Frontage Rd., Bldg. 7, Northbrook, IL 60062; (847) 272-3413

Norton Performance Plastics Corp., P.O. Box 3660, Akron, OH 44309-3660; (216) 798-9240

Organon Teknika, 100 Akzo Avenue, Durham, NC 27712; (919) 620-2000

Penn State University, University Creamery, 12 Borland Laboratory, University Park, PA 16802; (814) 865-7535

Pharmacia & Upjohn Animal Health, 7000 Portage Road, Kalamazoo, MI 49001; (616) 385-6726

PRISM, 8300 Executive Center Drive, Miami, FL 33166-4680; (305) 592-6312

Qualicon, A DuPont Subsidiary, P.O. Box 80357, Wilmington, DE 19880; (302) 695-2262

R-Tech, P.O. Box 116, Minneapolis, MN 55440-0116; (800) 328-9687

REMEL, L.P., 12076 Santa Fe Dr., Lenexa, KS 66215; (800) 255-6730

Rio Linda Chemical Company, 1902 Channel Dr., West Sacramento, CA 95691-3441; (916) 443-4939

Ross Laboratories, 625 Cleveland Avenue, Columbus, OH 43215; (614) 227-3333

Seiberling Associates, Inc., 94 North High Street, Suite 350, Dublin, OH 43017-1100; (614) 764-5854

Silliker Laboratories Group, Inc., 900 Maple Road, Homewood, IL 60430; (708) 957-7878

Sparta Brush Co., Inc., P.O. Box 317, Sparta, WI 54656; (608) 269-2151

Tekmar Co., P.O. Box 429576, Cincinnati, OH 45242-9576; (513) 247-7000

Unipath Co., Oxoid Division, 800 Proctor Ave., Ogdensburg, NY 13669-2205; (800) 567-8378

Walker Stainless Equipment Co., 618 State Street, New Lisbon, WI 53950; (608) 562-3151

Wal-Mart Stores, Inc., 702 S.W. 8th St., Bentonville, AR 72712; (501) 273-4903

Warren Analytical Laboratory, 650 'O' St., P.O. Box G, Greeley, CO 80632; (800) 945-6669

Weber Scientific, 2732 Kuser Road, Hamilton, NJ 08691-9430; (609) 584-7677

West Agro, Inc., 11100 North Congress Avenue, Kansas City, MO 64153; (816) 891-1528

Zep Manufacturing Co., 1310 Seaboard Industrial Blvd., Atlanta, GA 30318; (404) 352-1680

MARK OF COMPLIANCE



The 3-A Symbol Story

The 3-A Sanitary Standards Symbol Administrative Council, known throughout the industry as the "**3-A Symbol Council**," was organized in 1956. Its purpose is to grant authorization to use the **3-A Symbol** on equipment that meets 3-A Sanitary Standards for design and fabrication.

Processors (DIC)



Sanitarians
(IAMFES)

Equipment Mfrs.
(DFISA)

A Modern Concept

The modern concept of the 3-A program was established in 1944 when the Dairy Industry Committee (DIC) was formed. DIC is one of the three industry segments involved in the preparation of 3-A Sanitary Standards. These industry segments are:

- **Processors**, represented by DIC
- **Equipment Manufacturers**, represented by DFISA
- **Sanitarians**, represented by IAMFES

Use of the Symbol

Voluntary use of the **3-A Symbol** on dairy equipment:

- assures processors that equipment meets sanitary standards
- provides accepted criteria to equipment manufacturers for sanitary design & fabrication
- establishes guidelines for uniform evaluation and compliance by sanitarians.

3-A Sanitary Standards Symbol Administrative Council

3020 Bluff Road

Columbia, SC 29209-3502

803-783-9258 phone

803-783-9265 fax

Reader Service No. 228

OFF THE TOP

FROM THE PRESIDENT



By MICHAEL H. BRODSKY,
IAMFES President

“Forging links”

I recently received my copy of the September 1996 issue of “Food Microbiology Newsletter” published for the Food Microbiology Divisions of the Institute of Food Technologists and the American Society for Microbiology. As I was scanning through the newsletter, I was struck by the number of people I knew through IAMFES, who were also very active in IFT/ASM. The obvious suddenly dawned on me! Most of us are affiliated with more than one professional organization, often at local, national and international levels. Personally, while I am a member of a number of professional societies, I am most active in three organizations. I serve as President of IAMFES; I sit on the Board of Directors of AOAC International, Inc.; and I maintain an active role in our local affiliate, the Ontario Food Protection Association. Such involvement can create a dilemma when it comes time to register for or participate in meetings which overlap or which are scheduled very close together.

These are also difficult economic times and it is not always possible to get funding from our respective employers to participate in more than one meeting. Nor can we always afford the time to be actively involved in all of our associations. We are left with difficult choices to make. In addition, with many companies and agencies undergoing reorganization and downsizing, there is a great deal of movement of food safety professionals from one location to another. With this ebb and flow, there is a need, more than ever, to

maintain a network with our colleagues. How do we respond to this challenge?

Can we find a way to forge links between associations with related interests? Certainly as a minimum, we could establish liaisons between associations to keep each other apprised of meeting dates and other activities. We could offer our members joint information on job opportunities; both for those seeking employment and those looking to hire. We could consider co-sponsorships of symposia, workshops, etc. We could examine the possibilities of joint meetings or dovetailing meetings at convenient locations. We could offer complimentary booths at each other's meetings. Regardless of the links we forge, however, we must recognize that each association will want to retain its unique identity, independence, and organizational structure.

What do you think? Is the linkage concept unrealistic, “pie in the sky,” or is there a way to make it work? Should your Executive Board pursue this idea? What other professional organizations or societies do you think we should try to develop links with? I want to hear your thoughts, positive or negative. E-mail me at brodskm@gov.on.ca; Fax me at 416-235-5951; or call me at 416-235-5717.

Since this column is in the December issue of *DFES*, let me take this opportunity to wish you all the best of the holiday season and close with my New Year's wish: “May the best of 1996, be the worst of 1997!” Happy New Year!

Send us your Affiliate
News!



Address to:
Managing Editor, *Dairy, Food
and Environmental Sanitation*
6200 Aurora Ave.
Suite 200W
Des Moines, IA
50322-2863 or
FAX: (515) 276-8655



**ABC
RESEARCH**

**YOUR FULL SERVICE FOOD AND
ANALYTICAL CONSULTING
LABORATORY**

- FOOD CHEMISTRY
- ENVIRONMENTAL CHEMISTRY
- MICROBIOLOGICAL ANALYSES
- PRODUCT DEVELOPMENT-
PILOT PLANT
- CONTRACT RESEARCH
- PROBLEM SOLVING
- HACCP TRAINING-AUDITS
- PLANT SANITATION/GMP SURVEYS

ABC RESEARCH CORPORATION

3437 S.W. 24th Avenue
Gainesville, FL 32607
(352) 372-0436 FAX: (352) 378-6483

Reader Service No. 102

MAKE PLANS NOW TO ATTEND THE 1997 IAMFES ANNUAL MEETING

**JULY 6-9, 1997
HYATT REGENCY GRAND CYPRESS
ORLANDO, FL**

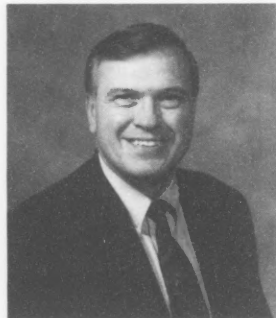
Learn about the most current technology,
practices, advances and issues in food safety.

For more information, contact IAMFES at (800) 369-6337;
(515) 276-3344; Fax (515) 276-8655; e-mail iamfes@dwx.com

* Registration forms will be available after January 31, 1997

PERSPECTIVES...

From the Executive Director



By DAVID M. MERRIFIELD,
IAMFES Executive Director

“Commercialism Policy revisited”

It hardly seems possible that by the time you read this, five months will have elapsed since our 83rd Annual Meeting in Seattle. As the memories of that July event fade, we are reminded that we are well into detailed planning for next year's meeting in Orlando. This includes the call for abstracts and entrants in the Developing Scientist Awards Competitions (due by December 16, 1996) that appeared in the August 1996 issue of *DFES*.

Also appearing in that issue was the IAMFES Policy on Commercialism. Applicable to all presenters, this important policy was adopted to preserve the educational integrity of our Annual Meeting program. In fact, it's so important that I'm dedicating the rest of this space to a review of it.

The policy is intended to restrict commercialism in technical manuscripts, graphics, oral presentations, panel discussions, symposia papers, and any other type submissions and presentations. It states at the outset that “no printed media, technical sessions, symposia, posters, seminars, short courses, and/or related type forums and discussions offered under the auspices of IAMFES are to be used as platforms for commercial sales or presentations by authors and/or presenters without the expressed permission of the IAMFES staff or Executive Board.” It goes on to say that this policy is enforced “so that scientific merit is not diluted by proprietary secrecy.”

What we're really after here is to not allow sales promotions to become a part of the educational program. There are ample opportunities at our Annual Meeting and in our journals, for sales promotions, but our educational forums are not one of them. We realize that in order to establish credibility as a speaker, it is sometimes necessary to identify yourself with an organization; however, excessive use of brand names, products names or logos, failure to substantiate performance claims, and failure to objectively discuss alternative methods, processes, and equipment are indicators of sales promotions and pitches. Restricting these types of commercialism benefits both the authors and recipients.

Let me take a moment to emphasize a few points in the policy. Excessive use of brand, product, and trade names and/or trademarks is not allowed. A rule

of thumb is to use the name once and thereafter use generic descriptors or neutral designations. It may be useful to report the extent of application of technologies, products, or services; however, such statements should review the extent of application of all generically similar ones in the field. Specific commercial installations may be cited to the extent that their data are discussed in the presentation.

Although general comparisons of products and services are not allowed, specific generic comparisons substantiated by data are allowed. Remember, conclusions or comparisons may only be made on the basis of reported data, and their scientific principles and validation of performance parameters must be described.

Before I leave this subject, a final word on graphics is needed. Slides, photos, videos, illustrations, art work, and any other type of visual aid should be included only to clarify technical points, not to promote a product or service. General graphics regularly shown in, or intended for sales presentations must be avoided. I would encourage you to pull out your August 1996 issue of *DFES* and review the policy carefully, especially if you intend to present at the 1997 Annual Meeting. If you would like a copy of the policy, you can call me at (515) 276-3344 or e-mail me at iamfesed@dwx.com. Finally, you may contact me or the PAC chair if you are in question whether your presentation complies with the policy.

We at the IAMFES office wish all of you the joy and happiness of this holiday season, and the best for 1997.

Support Your IAMFES Foundation Fund



To support the IAMFES Foundation Fund, send donations (**marked Foundation**) to: IAMFES, 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2863

What Is the IAMFES Foundation Fund?

The Foundation Fund is supported by membership of IAMFES sustaining members. Sustaining members are corporations, companies and individuals whose business interests reflect the goals and mission of IAMFES. Funds in the Foundation are kept totally separate from the operating funds of IAMFES and are used for worthy causes which enrich the Association.

What does the Foundation Fund support?

Revenue from the Foundation Fund currently supports the IAMFES:

- Ivan Parkin Lecture
- Audio-Visual Lending Library
- Developing Scientist Oral and Poster Competition
- Shipment of volumes of surplus JFP and DFES journals to developing countries through FAO in Rome
- Recruitment of exceptional speakers for IAMFES Annual Meetings on late breaking topics

Why should I contribute to the IAMFES Foundation Fund?

Any contribution, no matter how large or how small will help build a secure Foundation for the future of IAMFES. The future of IAMFES depends on how well we can meet the needs of our membership in providing educational programs, journals, products, and services, and on how well IAMFES fulfills its mission. The Foundation Fund was created to provide a long-lasting legacy of information and service for protecting the milk, food, water, and environment throughout the world.

Consumer Response to the Use of Lasers in Food Processing

Christine M. Bruhn, Howard G. Schutz, Margaret C. Johns, Cathi Lamp,
Gwendolyn Stanford, Yvonne J. Steinbring, and Dana Wong
Center for Consumer Research, University of California-Davis,
Davis, CA 95616-8598, USA

SUMMARY

Consumer response to the laser treatment of foods was investigated via group discussions with "conventional" consumers and "alternative" consumers previously found to be skeptical of innovations. Consumers were asked for an initial response to lasers, general food safety concerns, traditional and newer methods to control salmonella, and willingness to buy products treated by traditional or newer methods. Conventional consumers were concerned about salmonella and other bacteria: only 20% indicated they were willing to purchase untreated poultry. People had positive associations with the term laser, recalling its use in supermarket scanners, medicine, and entertainment. Most conventional consumers (57%) were undecided about the safety of laser-processed food, while most alternative consumers (61%) expressed concern. Nevertheless, about half (51%) of the conventional consumers said they were willing to buy laser-treated food on the basis of minimal information about the process and this proportion increased to two-thirds following the discussion. In the group discussions consumers wanted information about the process benefits, the safety of the treatment, community, environmental, and worker safety, and endorsement by recognized health experts. Consumers lacked information as to the food safety approach and specific food-handling practices used in the industry. Many found rinsing poultry with chlorinated water unappealing and expressed concern about flavor and environmental impact. Sanitarians, as credible professionals in the field, can contribute to consumer understanding of food safety issues.

INTRODUCTION

Ultraviolet light, a form of electromagnetic wave radiation which includes electric and radio waves, infrared and visible rays, and UV and shorter wavelengths, has been recognized as effective in controlling microorganisms since the early 1990s. Recently the availability of new pulsed, high-peak power light sources providing narrow-band UV (excimer lasers) and broadband UV flashlamps has permitted the investigation of new uses of laser light in food science. The use of pulsed UV laser technology as a nonthermal, nonadditive process to control surface microbial contaminations holds promise. Laboratory experiments have demonstrated laser effectiveness in decreasing microbiological contamination of poultry, reducing mold spores on produce, and destroying insects (7). Applications in the industrial setting are still in the exploratory stage; however, this new technology has numerous potential applications in the food industry, depending on public acceptance and cost effectiveness.

Consumer acceptance of a new technology is dependent on its portrayal by information sources and by consumer attitudes. Informa-

tion is most likely to be believed when it seems reasonable on the basis of prior knowledge and when the same message is heard frequently from credible sources (1). Consumer research indicates the public places greatest credibility in nutrition and safety information from recognized health professionals. Regulatory authorities have gradually increased in credibility in recent years, while consumer and advocacy groups have lost credibility (3, 5, 6, 8). Mass media is a widely used information source but it is not considered very reliable.

The purpose of this study is to investigate consumers' response to the concept of laser-treated foods by determining their initial response to the term, their concerns, perceived benefits of this technology, and their information sources for technological information. By identifying consumer attitudes toward laser processing and credible information sources prior to industrial use, possible consumer skepticism can be reduced and consumer-driven educational information can be developed and delivered.

MATERIALS AND METHODS

To anticipate a spectrum of consumer response to laser technology, two groups of consumers were interviewed. "Conventional" consumers were recruited from community service groups and "alternative" consumers were recruited from a local supermarket cooperative, members of which have been shown previously to resist technological change (2, 4). Consumers were not given information about the topic of discussion prior to recruitment to prevent self-selection based upon prior belief or orientation. As an incentive, participants received financial compensation which they could keep or donate to their organization. Participation was voluntary and followed University of California guidelines for human subjects.

The focus group began with an opening question to stimulate thought and assess current attitudes toward laser technology. Participants were asked, "Have you heard of lasers?" and "What do you think about when you hear the word laser?" Following this very brief discussion, consumers were given a prediscussion questionnaire in which they indicated their levels of concern for pesticides in food, antibiotics and hormone residues in animal products, food additives and preservatives, nitrates in food, food irradiation, salmonella and other bacteria, and cholesterol in food. The questionnaire included a written statement describing laser applications in entertainment, surgical procedures, supermarket scanners, and in decreasing or eliminating microorganisms in food. Following this statement, they were asked for their concerns about laser-treated foods and their willingness to buy laser-treated poultry, fruits, and vegetables.

After the prediscussion questionnaire was completed, the authors asked questions to determine the participants' general food safety concerns and specific concerns related to salmonella and other bacteria. The consumers were asked for their reactions to the use of chlorine dips and food irradiation to control salmonella. Laser treatment was described and the consumers were asked for their responses to laser-treated chicken, fruits, or vegetables. After the group discussion, consumers completed a postdiscussion questionnaire which was used to evaluate any attitude changes toward laser treatment. In addition, consumers were asked to rate the credibility of different information sources, and they were asked for standard demographic information.

Interviews took place throughout California from April 1993 to May 1994. Attitudes of conventional consumers were obtained from five interviews with an average group size of seven and total sample size of 35. Alternative consumers were more difficult to recruit. People would sign up for

an interview, but fail to appear. A total of five interviews were conducted with one to seven participants per interview, and a total of eighteen respondents. Authors Bruhn and/or Wong were present at each interview. The findings are based on an in-depth interview of a relatively small number of people. The results indicate thought processes and general impressions. The sample is not large enough for national projections.

The majority of subjects were Caucasian females and were married or living with someone (Table 1). Most (82%) of both conventional and alternative consumers had completed some post-high-school education. Fifty-six percent of the conventional consumers were 50 years of age or older with the 30 to 39 years of age group representing 20% of the sample. Family income of conventional consumers was \$20,000 to \$49,000. Alternative consumers were younger with 50% between 20 and 29 years of age and 39% between 30 and 39 years. Gross annual income was lower with less than half earning \$20,000. Occupations for both groups were widely diverse, ranging from professional and technical jobs to clerical, homemaking, and retirement.

RESULTS

General laser (nonfood) discussion

Both groups expressed a positive attitude toward lasers. People said "laser" reminded them of beams of light, supermarket scanners, surgical instruments, compact discs and/or movie discs, computer printers, and the movie, "Star Wars." One person even commented, "Lasers are cool."

Food safety concerns

Initial levels of concern among conventional and alternative consumers were not significantly different for pesticides, antibiotics,

TABLE 1. Demographic characteristics of consumers

Characteristic	Percent ^a consumers with characteristic		
	Conventional	Alternative	Total
Gender			
Female	96	61	83
Male	4	39	17
Employed outside the home	52	78	62
Marital Status			
Never married	15	39	24
Married	59	44	54
Separated/divorced	7	17	11
Widowed	19	0	11
Ethnicity			
Caucasian	89	88	89
African-American	4	6	4
Asian-American	4	0	2
Other	3	6	5
Age group (years)			
20-29	8	50	26
30-39	20	39	28
40-49	16	6	11
50-59	28	5	19
60 or older	28	0	16
Level formal education			
High-school graduate	18	0	11
Some college	39	22	32
College graduate	39	56	46
Post graduate	4	22	11
Annual family income			
Less than \$20,000	26	50	36
\$20,000-\$49,999	41	33	38
\$50,000-\$69,999	15	17	15
\$70,000 or more	18	0	11

^aConventional, n=52; alternative, 18; total, 53.

additives, nitrates, food irradiation, salmonella and bacteria, and cholesterol (Table 2). Despite previous questions about salmonella and the recognition that chicken may contain potentially harmful microorganisms, more than 60% of the alternative group were willing to purchase untreated poultry compared to 20% of conventional consumers (Table 3). Similarly, 72% of alternative con-

sumers were willing to buy untreated soft fruit with the current shelf life compared to 44% of conventional consumers. Previous research suggests that compared to the conventional, alternative consumers are more likely to find "natural" food products with a shorter shelf life acceptable (2).

Group discussion indicated most consumers have not thought of methods to control microorgan-

isms and responded negatively to rinsing poultry in chlorinated water. Concern about chemical rinses were also rated in a national survey. Several concerns raised potential flavor and safety issues noted in the following comments:

- Anything treated that way would not taste natural. I would not buy it.
- I can wash off the residue in vegetables, but meat is more porous.
- It is like marinating meat in bleach.
- The harmful effects of salmonella may outweigh the harmful effects of chlorine. You have to look at it that way if you've ever had food poisoning. I've had food poisoning twice, and I don't want to take the risk.
- I think that chlorine dumped into the creek isn't a good idea. I know it would kill other organisms in the water, so I'd be concerned with how they dispose of it afterwards.

Response to laser processing

When hearing about potential applications of laser processing to food, 57% of conventional consumers were undecided about safety, with 26% expressing minor concern (Table 4). In contrast, most alternative consumers expressed major or minor concern. Information influenced each group. After the discussion, about the same percentage of alternative consumers expressed major concern; however, those undecided increased to 41%. Most conventional consumers expressed minor concern (41%) or no concern (28%). Likelihood to buy laser-treated food increased to over 70% among conventional consumers. Most conventional consumers expected laser-treated food to be more expensive than nontreated food.

Some consumers said laser treatment of foods "sounds clean" on the basis of correlation between laser usage in medicine and laser treatment of food. Reflecting this

TABLE 2. Conventional and alternative consumer's concerns about food safety

Concern before and after dicussion	(Mean)		Significance ^a of difference between groups	Significance of change within groups	
	Conventional group	Alternative group		Conventional	Alternative
Pesticides					
Before	1.34	1.33	NS		
After	1.41	1.22	NS		
Change	-0.07	0.11		NS	NS
Antibiotics, hormones					
Before	1.57	1.22	NS		
After	1.28	1.22	NS		
Change	0.29	0.0		*	NS
Additives, preservatives					
Before	1.41	1.61	NS		
After	1.41	1.33	NS		
Change	0.0	0.28		NS	NS
Nitrates					
Before	1.82	1.44	NS		
After	1.87	1.33	*		
Change	-0.05	0.11		NS	NS
Food irradiation					
Before	2.14	1.59	NS		
After	1.77	1.29	NS		
Change	0.37	0.30		*	NS
Salmonella, bacteria					
Before	1.34	1.39	NS		
After	1.21	1.39	NS		
Change	0.13	0.0		NS	NS
Cholesterol					
Before	1.66	2.00	NS		
After	1.48	1.83	NS		
Change	0.18	0.17			NS
Laser treatment					
Before	3.31	2.24	*		
After	2.48	2.53	NS	*	
Change	0.83	-0.29			NS

^aNS, not significant; *, Significant at $P < 0.05$. Scored major concern = 1, Minor concern = 2, Undecided = 3, No concern = 4.

view, one consumer commented, "It appears to be safer than dipping and other treatments, and would not have residues if they are just using light." People wondered if all lasers were the same. They also commented on the potential use of laser treatment to reduce the use of pesticides.

Prior to the discussion, about half of conventional consumers were willing to buy laser-treated poultry or fruit, and the proportion increased to two-thirds following

discussion (Table 3). Half or more of alternative consumers preferred to buy untreated poultry and fruit both prior to and after discussion; however, about one-quarter were interested in buying the laser-treated foods after the discussion.

Many consumers volunteered they would prefer laser-treated over irradiated food.

- I don't think I'd really be against lasers. I guess it's because I haven't really

heard anything bad about lasers, whereas X-rays have a lot of risks medically.

Some, however preferred irradiation because it penetrated the entire food.

- This is the most effective and least dangerous of the treatments. It leaves no residues.

The treatment method made no difference to others.

- I am neutral. I just eat.

TABLE 3. Percentage of consumer groups willing to buy laser-treated, irradiated, or untreated poultry and fruit before and after discussion

	Percent ^a consumer groups			
	Before discussion		After discussion	
	Conventional	Alternative	Conventional	Alternative
Poultry				
Untreated	20	61	15	50
Irradiated	29	11	22	6
Laser	51	33	67	28
Fruit				
Untreated	44	72	21	61
Irradiated	23	11	14	6
Laser	47	28	69	22

^aConventional group, n = 35; alternative, 18.

TABLE 4. Consumer response to laser-treated food

Response to:	Percent consumer group with positive response			
	Before discussion		After discussion	
	Conventional	Alternative	Conventional	Alternative
Laser use on food				
Major concern	6	39	14	35
Minor concern	26	22	41	18
Undecided	57	33	17	41
No concern	11	6	28	6
Use of lasers should be labeled				
Likely to buy laser-treated food	74	78	93	86
Expect cost of laser-treated food to be:	37	17	72	22
More expensive	66	39	79	33
Same price	11	11	10	22
Uncertain	17	33	11	34
Less expensive	6	17	0	11

- I've heard about it, and I don't care.

Others, specially alternative consumers, preferred no treatment.

Concerns about laser treatment were expressed by some in each group. Consumers frequently asked about long-term effect and potential carcinogenic residue.

- You might come out with these things, and in a few years it is cancer-causing.
- I don't want side effects and have to correct problems later.

Several wanted to know if there was an effect on nutritional quality.

Some consumers wondered which countries were using lasers. Those who were more risk adverse indicated they would be more comfortable if other countries had been using the technology for years and years.

- If the technology is too new, I would not buy it. There could be long-term effects that you don't know about.
- I would not buy it now, maybe in 10 years.

Some wondered if lasers would always work well.

- I am skeptical about how it works.

Consumers implied that a method was needed to assure the laser effectively did the job.

- Just make sure it's effective and that it really works. Light lasers are used at the supermarkets and libraries. If they can't read the UPC code, then you can just type in the number and it tells you what it is.

People were concerned about the impact of a laser treatment facility in a community. They wondered if there were emissions or if the worker or the public was at risk when near a laser facility.

- Are there little brown people getting paid 35 cents an hour and dying at 35, or going blind?

People wondered if the facility emitted rays or energy, like tele-

TABLE 5. Consumer judgment of the credibility of information sources

Information source	Percent consumer group response			n
	Credible	Uncertain	Not credible	
University scientist	67/61	33/39	0/0	27/18
Health professional	79/65	21/35	0/0	28/17
FDA	57/59	43/12	0/29	28/17
Consumer group	48/61	48/33	4/6	27/18
Public television	25/76	57/12	18/12	28/17
Food industry	37/6	52/44	11/50	27/18
Newspaper article	19/33	48/56	33/11	27/18
Supermarket material	0/0	52/33	18/50	27/18
Commercial television	11/18	52/0	37/82	27/17

phone wires. Environmental concerns were expressed by many.

- It is great if it doesn't change the environment.

Both conventional and alternative consumers felt that the real problem and the emphasis of food safety should be the improvement of food-handling practices. Consumers felt that laser processing may serve as a catch-all, possibly increasing inappropriate food-handling practices prior to treatment.

Both groups also criticized the efficiency of laser treatment since it is only a surface treatment.

- It sounds to me the surface isn't enough. I'm not sure why you would care about doing it to the surface because you are going to eat the inside. It seems to me that the theory is flawed.

Consumers agreed that they needed more information about laser treatment of foods prior to purchasing.

When asked what they would say if given the opportunity to "send a message" to the company

developing this technology, consumers stressed the need for comprehensive research honestly conveyed to the public. Most also expressed a desire for labeling.

Typical responses included:

- Just be thorough and honest.
- Just make sure there is more testing for long-term effects, and also labeling so we can make our own decisions.
- I don't trust the government or government safety standards. A good result raises questions in my mind. I am skeptical of any chemicals or procedures.
- If this is a good technology and this will help make people less sick, wonderful! But I need proof from an independent party.

Informing the consumer

Consumers were asked to evaluate the credibility of different sources of information. Health professionals, university scientists, the FDA, and consumer groups were considered credible or very

credible by over half of the consumers interviewed (Table 5). More than half of conventional consumers indicated that their concern about laser processing would decrease if the process was approved by FDA. Commercial television was considered not credible by the largest percentage of consumers. This relative credibility is consistent with that reported in national surveys (5, 6). These findings suggest that the traditional avenues for consumer education, such as supermarket flyers and newspaper articles, should not be the sole source of consumer education. Multiple avenues of information should be pursued since consumers indicate that consensus of several sources increases believability.

Consumers expressed an interest in how laser processing affects food safety, quality, and nutritional value, and how processing facilities impact community health and safety. Educational messages about laser processing should include a brief discussion of the benefits of the treatment, the safety of the treated food, food-related laser techniques, community, environmental, and worker safety, and endorsements of recognized health authorities.

CONCLUSION

Most consumers are familiar with the term laser and respond to the word positively. Acceptance of this technology would be enhanced by consumer education. Conventional consumers want more information about laser treatment while alternative consumers are skeptical of its safety and benefits.

Although the focus of this research was laser processing, findings have application to consumer education on food safety and introduction of any new technology. In evaluating a food treatment, people have questions about food, worker, and community safety. Therefore information about new technologies must be broad-based

and address the total food and environmental system.


People are unaware and somewhat skeptical of common food sanitation practices and believe foodborne microbes should be controlled simply by careful handling. Consumers need to be reminded that pathogenic bacteria can contaminate a surface via aerosol in a washing room, and that visual cleanliness does not guarantee microbiological sterility. Some are concerned that new technologies may be used to compensate for careless food handling. To address this misconception consumers should hear about the multiple control point approach critical to good management practices and hazard analysis critical control point programs. Chlorinated wash,

pasteurization, or other processes are effective when part of a total quality program.

Sanitarians, as members of the credible scientific community, have an opportunity to make a difference in consumer education. Educational out-reach can be enhanced if these points are considered in professional as well as informal communications with the public.

REFERENCES

1. Bruhn, C., S. Peterson, P. Phillips, and N. Sakovich. 1992. Consumer response to information on integrated pest management. *J. Food Safety* 12: 315-326.
2. Bruhn, C. M., H. G. Schutz, and R. Sommer. 1986. Attitude change toward food irradiation among conventional and alternative consumers. *Food Technol.* 40(1):86-91.
3. Center for Produce Quality. 1992. Fading scares—future concerns: trends in consumer attitudes toward food safety. Produce Marketing Association Alexandria, VA.
4. Fjeld, C. R., H. G. Schutz, and R. Sommer. 1984. Environmental values of food cooperative shoppers, ch. 20. In R. E. Pitts and A. G. Woodside, (ed.), *Personal values and consumer psychology*. Lexington Books, Lexington, MA.
5. Hoban, T. J. 1993. Consumer attitudes and acceptance of bovine somatotrophin. *Grocery Manufacturers of America*.
6. Hoban, T. J., and P. A. Kendall. 1992. Consumer attitudes about the use of biotechnology—agriculture and food production. North Carolina State University, Raleigh, NC.
7. Lagunas-Solar, M. 1996. Submitted for publication.
8. McNutt, K. W., M. E. Powers, and A. E. Sloan. 1986. Food colors, flavors, and safety: a consumer viewpoint. *Food Technol.* 40(1):72-78.



Applied Research Institute
Serving the Dairy Industry for over 40 years

*Do YOU Have a
Copy of Our New
Catalog for ALL your Dairy,
Food, and Environmental
Testing needs?*

Now Including:
Milk Smear Slides & Stains
Gerber Fat Test Glassware
Babcock Fat Test Glassware
Gerber & Babcock Chemicals
Thermometers
Dairy & Water Test Kits

**Call toll free now!
1-888-DAIRY-00**

Reader Service No. 108



Standards and Calibration Sets

Raw Milk Component Standards
Raw Lowfat Component Standards
Past/Homo Lowfat Standards
High Fat Cream Standards
Light Cream Standards
Electronic Somatic Cell Standards
Whey Standards
Urea Standards

Chemical and Bacteriological Testing

Milk and Milk Products
Producer Quality & Component Testing
Mastitis Culture/Cow or Bulk Tank
Third Party Verification/Validation

High Performance Liquid Chromatography Carbohydrates Antibiotics in Milk

Mounds View Business Park
5205 Quincy St.
Mounds View, MN 55112
(612)785-0484 phone
(612)785-0584 Fax

Reader Service No. 129

Regulatory Responsibility within the U.S. Dairy Industry

Thomas M. Gilmore
Dairy and Food Industries Supply Association
1451 Dalley Madison Boulevard, McLean, VA 22101-3850, USA

SUMMARY

In the United States, the safety and quality of milk and dairy products is the responsibility of both federal and state agencies. The Food and Drug Administration has certain responsibilities under the Food, Drug, and Cosmetic Act, the Public Health Act, the Milk Import Act, and the National Conference on Interstate Milk Shipments. The U.S. Department of Agriculture, Agricultural Marketing Service, Dairy Division provides various programs for the dairy industry including administering federal milk marketing orders and the grading and supervising production of certain non-Grade A dairy products. The individual states have enacted safety and quality regulations for Grade A and manufacturing grade milk. Aseptic regulations for milk products come under the authority of the FDA and the state regulatory authority.

desserts, and cheese (excluding cottage cheese). Less stringent sanitation requirements apply to the production and handling of Grade B milk, and such milk may be used only in manufactured dairy products such as butter, cheese, and powdered milks. Ninety percent of milk is sold to plants and dealers as Grade A.

The topics to be covered in more detail are:

- The rationale for the Grade A Program in America
- The *Grade A Pasteurized Milk Ordinance*
- The role of the FDA
- The role of the USDA
- The role of the states
- Aseptic processing

INTRODUCTION

In the United States, the safety and quality of milk and dairy products is the responsibility of both federal and state agencies. On the federal side, these responsibilities are assumed by the Food and Drug Administration (FDA), which is part of the U.S. Department of Health and Human Services, and the U.S. Department of Agriculture (USDA). The FDA has the ultimate regulatory authority and monitoring responsibility over the dairy industry, while USDA involvement with this industry is voluntary and

service-oriented. Each state carries out certain regulatory functions with respect to the dairy industry within that state.

In dealing with the safety and quality of milk and dairy products, the U.S. dairy industry identifies two grades of milk: Grade A and manufacturing grade (commonly called Grade B). Grade A milk is produced and handled in accordance with strict sanitation requirements and is intended for use in fluid milk products. Grade A milk may be used in manufactured dairy products such as ice cream, frozen

RATIONALE FOR GRADE A PROGRAM

Interstate milk shipment program

In the 1920s and 1930s, the movement of milk and milk products from one political jurisdiction to another was restricted by the availability of producer milk to a point of processing and marketing. Exceptions occurred in large metropolitan areas contiguous to one or more political subdivisions, which made it necessary for milk to be shipped across political (or regulatory jurisdiction) boundaries.

A second and equally important impediment to the movement of milk was differences in state and local public health regulations. These differences often made it difficult, if not impossible, to ship milk between geographical areas. If movement was necessary, it was often done under the supervision of the local regulatory authority.

It was with this background that dairy industry leaders and government regulatory authorities initiated action that led to the formation of the National Conference on Interstate Milk Shipments (NCIMS) in the early 1950s. The goal of the Conference is (1) to provide sanitary regulations to protect public health; (2) to ensure uniformity and enforcement of milk regulations, and reciprocity; and (3) to ensure that milk is produced under regulations which would safeguard public health—in short, the objective was and remains to provide “The best possible milk supply for all people.”

National conference on interstate milk shipment

The Conference is a voluntary organization consisting of representatives from each state, FDA, USDA, and the dairy industry. This organization maintains a federal-state milk certification program (Interstate Milk Shippers Program) to facilitate the movement of Grade A milk in interstate commerce. The program relies on the *Grade A Pasteurized Milk Ordinance* (PMO) for uniform sanitary standards, requirements, and procedures. This program provides the state agencies, U.S. governmental agencies (Department of Defense, General Services Administration), and the dairy industry with reliable data on sources of acceptable high-quality milk. These sources are published quarterly in the *IMS List Sanitation Compliance and Enforcement Ratings of Interstate Milk Shippers*. The IMS List is available from the FDA-Milk Safety Branch. 3-A

Sanitary Standards are referenced in the PMO as appropriate sanitary design criteria and are used in many cases to evaluate the compliance of equipment with established hygienic standards.

FOOD AND DRUG ADMINISTRATION RESPONSIBILITIES

The Food and Drug Administration has the responsibility under the Food, Drug, and Cosmetic Act, the Public Health Act, and the Milk Import Act to assure the public that the nation's milk supply and imported dairy products are safe and wholesome. The FDA has the regulatory authority to require processors of both Grade A and Grade B milk to take remedial action when conditions exist that could jeopardize the safety and wholesomeness of milk and dairy products being handled. Normally, FDA limits its compliance activities to milk and dairy products moving in interstate commerce.

To lessen its regulatory compliance burden, the FDA has entered into a cooperative arrangement with the states. Through a Memorandum of Understanding with the National Conference on Interstate Milk Shipments (NCIMS), which comprises all 50 states, the FDA and the states share the responsibility for ensuring the safety and wholesomeness of Grade A milk and dairy products. To assist in this effort, FDA has cooperated in developing and publishing, for state adoption, “model” regulations that address safety and quality issues.

Grade A pasteurized milk ordinance

These model milk regulations, titled the *Grade A Pasteurized Milk Ordinance* (PMO), are not produced by the U.S. Public Health Service (PHS) and the Food and Drug Administration alone and are not written as a federal law. The PMO is developed as a uniform standard for the effort between federal and state milk sanitation and

regulatory agencies. The evolution of the PMO has been a truly cooperative effort.

The PMO comprises two parts and appendixes and contains sanitary quality standards for Grade A pasteurized milk and milk products.

Part I is unabridged; it is arranged and presented in a form which can be adopted as an ordinance or as any other legal instrument.

Part II contains the Ordinances, the public health reason for each requirement, and administrative procedures that are designed to unify the interpretation of the PMO and, particularly in the case of the sanitation requirements, provide details as to methods of satisfactory compliance. It should be noted that Section 15 provides that enforcement shall be in accordance with the administrative procedures contained in Part II.

The Appendixes are 15 in number, containing detailed explanatory material on various aspects of milk sanitation technology and administration—for example, individual water-supply and sewage disposal-system standards, pasteurization-equipment specification and tests, industry dairy-farm inspector-certification procedures, and milk-production methods.

The Public Health Service and Food and Drug Administration recommend that the PMO be the basic standard used in the voluntary state-Public Health Service cooperative for certification of Interstate Milk Shippers. The PHS (Public Health Service) has legal jurisdiction to enforce milk sanitation standards on interstate commerce of milk and milk products.

The PMO is incorporated by reference in federal specifications for procurement of milk and milk products; it is used by the sanitary regulators for milk and milk products served on interstate carriers; it is recognized by public health agencies, and the milk industry and has been adopted by the states as a

national standard for milk sanitation. It is also recognized in the 1995 edition of the FDA *Food Code* relative to acceptable milk sources.

The advantages of the NCIMS (National Conferences on Interstate Milk Shipments) cooperative programs are:

- A. The model ordinance and code discourages the use of public health regulations to establish unwarranted trade barriers against the acceptance of high-quality milk from other milksheds. Provides for full reciprocity which allows free interstate movement of IMS-listed milk and milk products.
- B. The model ordinance and code allows the establishment of effective and well-balanced milk sanitation programs in each state.
- C. The Conference stimulates the adoption of adequate and uniform state and local milk-control legislation and encourages the application of uniform enforcement procedures through appropriate legal and educational measures.

In addition to participating in preparing the PMO, the responsibilities of the PHS and FDA to the NCIMS include:

- A. Standardizing the rating procedures of state and federal personnel at least every three years.
- B. Publishing a list of Regional Milk Specialists and State Milk Sanitation Rating Officers whose rating methods and interpretations of the PMO have been evaluated and certified by the PHS and FDA.
- C. Standardizing the evaluation procedures of State Milk Laboratory Evaluation Officers and State Sampling Surveillance Officers.

- D. Publishing a list of State Milk Laboratory Evaluation Officers whose competence in interpreting and evaluating milk laboratory methods have been evaluated and certified by the PHS and FDA.
- E. Publishing quarterly the *Sanitation Compliance and Enforcement Ratings of Interstate Milk Shippers* (IMS List). The IMS List contains a state-by-state enumeration of all current listed milk and milk product shippers, along with their products' sanitation and enforcement rating scores.
- F. Extending to state regulatory agencies and educational institutions assistance in the training of representatives of state and local governmental units, including milk sanitation rating, milk laboratory evaluation, sampling surveillance officers, and dairy industry personnel.
- G. Conducting check ratings of the sanitation compliance status of listed interstate shippers.
- H. Evaluating and approving the laboratory facilities and publishing a list of approved laboratories.
- I. Assisting in development of sanitary standards for the fabrication of single-service containers and closures for milk and milk products and publishing a list of acceptable single-service plants.

On the Grade B side, the FDA has an arrangement with the USDA under which the latter assists the states in developing safety and quality regulations for the manufacturing milk industry within their local areas. The FDA periodically inspects ice-cream, frozen-dessert, and cheese-manufacturing plants for compliance with the Food, Drug, and Cosmetic Act using the

PMO or the current Good Manufacturing Practice in Manufacturing, Packing, or Holding Human Food. FDA also promulgates standards of identity and labeling, quality, and fill-of-container requirements for milk and dairy products moving in interstate commerce.

UNITED STATES DEPARTMENT OF AGRICULTURE RESPONSIBILITIES

Under the authority of the Agricultural Marketing Act of 1946, the United States Department of Agriculture (USDA) is directed to carry out certain voluntary service functions to aid in the efficient marketing of American agricultural products. These services include developing quality grade standards and specifications for foods, furnishing inspection and grading services, and recommending standards to encourage uniformity and consistency in commercial practices.

Dairy grading and standardization activities

The USDA develops and revises U.S. grade standards and federal specifications for manufactured dairy products to facilitate fair trade between buyers and sellers. These standards are the basis for assigning official U.S. grades to such products.

The USDA also inspects dairy manufacturing plants to determine if good sanitation practices are being followed. Only after an inspection shows that the plant has met the requirements in the *General Specifications for Approved Plants* can that plant qualify for other services of grading, sampling, testing, and certification of its products. The USDA has no regulatory authority regarding plant of its products. The USDA has no regulatory authority regarding plant. The USDA/Agriculture Marketing Service (AMS) publishes a quarterly

list of *Dairy Plants Surveyed and Approved for USDA Grading Service*. The dairy plants listed in this publication are inspected periodically by the USDA.

USDA plant approval is determined by unannounced inspections, conducted at least twice yearly and covering more than 100 items, including milk supply, plant facilities, condition of equipment, sanitary practices, and processing procedures. The inspection and grading criteria are outlined in *General Specifications for Dairy Plants Approved for USDA Inspection and Grading Service of Manufactured or Processed Dairy Products* (7 CFR 58.101 to 58.938) administered by the Dairy Division of the USDA.

The Dairy Grading Branch of the AMS Dairy Division also provides service under its resident grading and quality control service. Plants using this service are listed in *Dairy Plants Surveyed and Approved for USDA Grading Service* with an asterisk. This full-time program offers on-the-spot official grading of the plant's manufactured products, laboratory testing and quality control, and plant inspection services. The resident program also makes available to the plant manager the technical know-how and experience of the Dairy Grading Branch's supervisory staff for help in solving product quality problems.

Plant inspection services and the Resident Grading and Quality Control Program are available on a voluntary basis, and fees are charged to cover costs.

Additionally, the USDA Dairy Grading Branch conducts equipment sanitary design reviews. The USDA Dairy Grading Branch fully supports and utilizes established 3-A Sanitary Standards and 3-A Accepted Practices. When equipment or systems are presented for USDA review for which a 3-A standard or practices have been developed, the USDA will use the

sanitary criteria of that document. When a USDA review of equipment is requested for which there are no 3-A standards, the USDA will use the general criteria found in their publication titled *USDA Guidelines for Dairy Equipment Design and Fabrication*. These guidelines are consistent with the sanitary criteria found in the 3-A Sanitary Standards.

United States Department of Agriculture model regulations

Under an arrangement with the FDA, the USDA assists individual states in establishing safety and quality regulations for manufacturing-grade (Grade B) milk. In this regard, the USDA has developed model regulations for state adoption that related to the quality and sanitation aspects of producing and handling such milk. These regulations are set forth in the *Recommended Requirements for Milk for Manufacturing Purposes and Its Production and Processing*. USDA officials monitor the state programs to determine compliance with the *Recommended Requirements* and also provide training to state inspectors. The 29 states that have Grade B milk have adopted these model regulations.

The National Association of State Departments of Agriculture has endorsed the *USDA Recommended Requirements* as the minimum acceptable standards for all milk produced for manufacturing purposes. State regulations which are more strict can be written into the law to fit particular local needs. A state has the regulatory authority to permit or reject the sale of raw manufacturing-grade milk based on compliance with these laws. The USDA monitors the progress being made toward uniform enforcement of the *Recommended Requirements* by reviewing state laws and dairy farm facilities. Observations made by USDA representatives are discussed with state officials. These discus-

sions and comparisons with neighboring states are useful to initiate needed changes in state laws, and to get state funding for effective enforcement programs.

RESPONSIBILITIES OF THE STATES

Individual states have enacted safety and quality regulations for Grade A and manufacturing-grade (Grade B) milk which are essentially identical to those set forth in the PMO and the USDA Recommended Requirements, respectively. The enforcement of these regulations is normally the responsibility of state departments of health or agriculture. The states' authority comes from their state statutes. The states are the primary regulatory agencies and generally have the last word.

Specifically with respect to equipment, approval must come from state regulatory authorities. Most states have adopted the PMO as their basic Grade A milk sanitation document. Some have adopted 3-A Sanitary Standards and 3-A Accepted Practices as regulation while others use 3-A criteria during plant inspections. The states sometimes rely on the Public Health Service and Food and Drug Administration for guidance on many issues. This may involve equipment for which there are no 3-A standards or for application and/or interpretation of specific requirements of the PMO. The Public Health Service and Food and Drug Administration may issue coded memoranda on selected issues not covered by existing regulations or standards and/or to clarify existing regulations. Even though the states are the primary enforcement authority, if there is imminent public health danger, the Public Health Service and Food and Drug Administration will enter directly into the regulatory process by the authority granted them by

the Food, Drug, and Cosmetic Act. However, the Public Health Service and Food and Drug Administration usual stature is one of cooperation, assistance, and advice.

The states' role is of course much more detailed than is described here; but the enforcement procedures for certifying interstate milk shippers will be uniform in all 50 states. The regulations may vary slightly from state to state, but they will have as a minimum those found in the PMO and the 3-A Sanitary Standards.

The states may also establish their own standards of identity and labeling requirements for milk and dairy products; however, they are generally uniform with the federal requirements.

GOVERNMENT REGULATION OF ASEPTIC PROCESSING AND PACKAGING

There are three sets of regulatory requirements for food safety applicable to aseptic food processing and packaging operations. Aseptic systems can fall under the regulatory jurisdiction of either the Food and Drug Administration or the United States Department of Agriculture. The processor and/or equipment supplier will need to determine which regulatory requirements are pertinent based upon the type of product being processed. When milk or milk products, as defined in the PMO, are involved, the aseptic operation must comply with the provisions of the PMO in addition to the Food and Drug Administration low-acid canned-food regulations (LACF). Since 1983 the PMO has included aseptically processed milk products and serves as a code of practice for the production and processing of these products.

FDA regulations

Low-acid and acidified low-acid food products which contain little or no meat or poultry are covered by the FDA Good Manufacturing

Practice (GMP) regulations for "Thermally Processed Low-Acid foods Packaged in Hermetically Sealed Containers," and for "Acidified Foods." These regulations are found in Title 21 of the *Code of Federal Regulations*, (CFR) parts 108, 113, and 114. Section 113.40 (g) lists specific requirements for low-acid aseptic processing and packaging systems, including specifications for equipment and instrumentation.

The FDA requires registration of aseptic processing plants and filing of thermal processes and sterilization procedures before food products can be distributed in interstate commerce. The FDA regulations rely upon aseptic processing and packaging authorities to establish adequate parameters for sterilization of product, packages, and equipment, so that commercial sterility of the end product is ensured.

The FDA exerts its influence over the types of aseptic processing and packaging systems that can be utilized to produce foods for distribution into interstate commerce by its review and acceptance or rejection of process filing forms from individual companies. When a company files processing schedules for new aseptic processing or packaging systems, the FDA technical staff requests sufficient information from the processor to evaluate the adequacy of the equipment and procedures to produce a commercially sterile product. Usually, the equipment manufacturer(s) and the processing authority are involved in the presentation of this information to the FDA. The FDA relies upon periodic inspection of processing plants to monitor compliance with these regulatory requirements.

Food-contact surfaces of aseptic packaging materials, and package sterilization media, including hydrogen peroxide and irradiation, must be approved by the FDA

for their intended purpose before they may be used in FDA- or USDA-regulated food establishments. Present approved uses are listed in 21 CFR 174 through 179. For new uses a petition must be submitted to the FDA to amend the food additive regulations. Procedures and types of data necessary to support such a petition are described in 21 CFR 171.

United States Department of Agriculture/Food Safety and Inspection Service aseptic guidelines

Aseptically processed (and nonaseptically processed) products containing the equivalent of at least 3% raw meat or 2% cooked poultry, fall under the jurisdiction of the USDA Food Safety and Inspection Service (FSIS). Products containing less than 2% cooked poultry may receive FSIS inspection on a voluntary basis. FSIS currently regulates aseptic processing and packaging operations through procedures described in a 1984 publication, *Guidelines for Aseptic Processing and Packaging Systems in Meat and Poultry Plants*. These guidelines cover the types of information that will be required by the FSIS before approval of aseptic processing and packaging systems.

CONCLUSION

The dairy regulatory situation in the U.S. may involve the FDA, USDA, and/or state regulatory authorities. Although the FDA has oversight responsibilities for ensuring the safety and quality of milk and milk products, it is the individual states which have the primary responsibility for regulation of dairy farms and milk plants and equipment approval. The USDA Dairy Division is not a regulatory agency, but offers voluntary inspection services. However, in order for a dairy product to receive

a USDA Grade it must be manufactured in a USDA-inspected plant, and only graded dairy products are eligible for purchase by the Commodity Credit Corporation.

SOURCES OF INFORMATION

1. Abele, C. A., and E. Wallenfeldt. 1970. History and development of Grade A program in America. University of Wisconsin, University of Wisconsin Press, Eau Claire, WI.
2. Anonymous. Dairy plants surveyed for USDA grading service. USDA-Agricultural Marketing Service, Washington, D.C.
3. Federal Register. 1975. General specifications for dairy plants accepted for USDA inspection and grading service. Fed. Regist. 40:47910-47940.
4. Anonymous. 1995. Grade A pasteurized milk ordinance. U.S. Department of Health and Human Services, Public Health Service, Food and Drug Administration, Washington, D.C.
5. Anonymous. IMS list sanitation compliance and enforcement ratings of interstate milk shippers. U.S. Department of Health and Human Services, Public Health Service, Food and Drug Administration, Washington, D.C.
6. Anonymous. 1995. Milk pasteurization controls and tests. Food and Drug Administration State Training Branch, Rockville, MD.
7. Anonymous. Procedures governing the cooperative state-Public Health Service Food and Dairy Administration program for certification of interstate milk shippers. U.S. Department of Health and Human Services, Public Health Service, Food and Drug Administration, Washington, D.C.
8. Anonymous. 1996. Code of Federal Regulations, Title 21, Parts 108, 113, 114. U.S. Government Printing Office, Washington, D.C.
9. Anonymous. 1996. Code of Federal Regulations, Title 21, Parts 174-179. U.S. Government Printing Office, Washington, D.C.
10. Anonymous. 1993. U.S. Federal Food, Drug, and Cosmetic Act, as amended. U.S. Government Printing Office, Washington, D.C.
11. Anonymous. 1995. USDA guidelines for dairy equipment design and fabrication. USDA-Agricultural Marketing Service, Washington, D.C.
12. Federal Register. 1972. USDA milk for manufacturing purposes and its production and processing—Recommended Requirements. Fed. Regist. 37.
13. Anonymous. 1984. USDA-FSIS Guidelines for aseptic processing and packaging systems. USDA-FSIS, Washington, D.C.
14. Anonymous. 3-A sanitary standards. International Association of Milk, Food and Environmental Sanitarians, Des Moines, IA.
15. Carson, R. B. History of milk sanitation, milk pasteurization controls and tests manual, 1st ed. State Training Branch, USPHS, Rockville, MD.
16. Haskell, W. H., F. J. Moss, and H. E. Eagan. History of milk sanitation. FDA—State Training Branch, Rockville, MD.
17. Westoff, D. C. 1978. Heating milk for microbial destruction. A historical outline and update. J. Food Prot. 41:122-130.

WANTED:

Cover Photos

Dairy, Food and Environmental Sanitation encourages readers and advertisers to submit visually interesting 8 1/2" x 11" four-color photos to be considered for publication on the cover of the journal.

Send photographs, negatives and/or slides to:

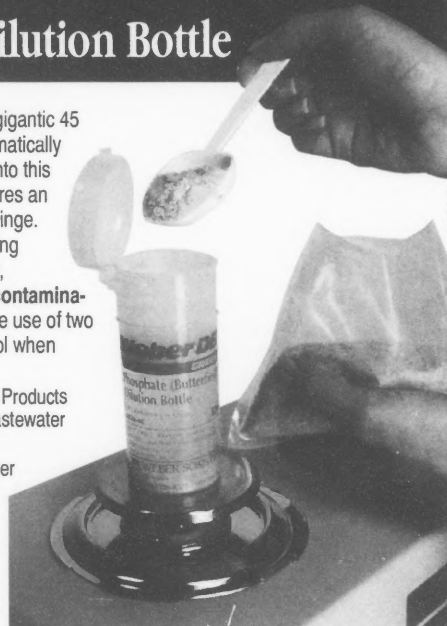
Publications Specialist
Dairy, Food and Environmental Sanitation
6200 Aurora Ave.
Suite 200W
Des Moines, IA
50322-2863



The Weber DB™ Wide-Mouth Dilution Bottle

Our pre-filled dilution bottle has a gigantic 45 mm opening. You will find it is dramatically easier to measure most samples into this larger mouth. The bottle also features an attached cap with a unique living hinge. It stays put and out of the way during use, and is never set down or held, **greatly reducing the chance of contamination.** This design also promotes the use of two hands for superior ease and control when adding a sample to the diluent.

- Formulations for Foods and Dairy Products (Butterfield's Buffer), or Water/Wastewater (Phosphate Buffer)
- Single Service – Pre-Filled to Either 99 or 90 ml
- Leakproof
- Guaranteed Sterile
- Accurately Buffered to 7.2 ± 0.2
- Most economical bottle available by far ... only 54¢ per use



WEBER SCIENTIFIC
2732 Kuser Road, Hamilton, NJ 08691
609-584-7677 • Fax: 609-584-8388

To order or for more information:
800-328-8378

Reader Service No. 190

Bulk Starter Media for Mesophilic Starter Cultures: A Review

S. A. Ibrahim and M. H. Daguri

Department of Nutrition and Food Science, University of Jordan, 11942, Amman, Jordan

INTRODUCTION

Lactic acid bacteria are used in the production of fermented dairy products such as yogurt, sour cream, and many types of cheeses (8, 40). In cheese manufacturing, starter cultures are added to fermentation tanks and cheese vats at a predetermined rate to allow the timely sequencing of manufacturing steps. Thus, for large-scale production of cheese, a bank of suitable cultures is required (40). Cultures should be selected according to their quality characteristics before being used in cheese manufacturing (8, 19, 40). Besides the type of culture used, the type of medium used for propagation of such cultures plays an important role in their performance in fermentation (6). It has been established that different types of bulk media had different effects on starter culture activity regarding the yield produced. Therefore, bulk media should be selected properly to achieve the maximum activity of starter cultures. The aims of this review are to present a brief description for the selection of mesophilic starter cultures, to highlight some technical aspects of bulk media used in propagation of mesophilic starter cultures, and to review the agglutination behavior of mesophilic starter cultures as a

major problem associated with internal pH control medium (ICM).

CULTURE SELECTION

In cheese making, starter-culture performance and activity represent more uncertainties than other processing steps, such as renneting and cooking, which are relatively constant from day to day (40, 43). Starter culture is used to produce sufficient lactic acid and to obtain desirable cheese flavor and textural characteristics (11, 40). Lactic cultures convert lactose in milk to lactic acid and a few other desirable end products.

The most common type of cultures used are termed single or mixed strains (11, 22). A single-strain culture contains one strain of either *Lactococcus lactis* subsp. *lactis* or subsp. *cremoris*. A mixed-strain culture contains two or more compatible strains (11, 29, 40). Some commercial cultures may also contain one or more strains of flavor bacteria such as *Leuconostoc mesenteroides* subsp. *cremoris* or *Lactococcus lactis* biovar *diacetylactis*. Most mixed- or multiple-strain starter cultures used for cheese manufacture contain one or more strains of *L. lactis* subsp. *cremoris* (29, 40). The use of starter cultures that include strains

of *L. lactis* subsp. *lactis* has decreased in recent years because cheese produced with these starter cultures often develops fruity, fermented, and bitter flavor (14, 49). In addition, *L. lactis* subsp. *lactis* is more susceptible to phage infection than *L. lactis* subsp. *cremoris* (49).

A culture must satisfy a number of important requirements before it can be used in cheese manufacturing. These requirements include essential acid production and flavor development (29), phage insensitivity (50), absence of bacteriocin (3), and sensitivity to cooking temperature (32). Individual strains of starter cultures have been shown to produce different yields due to variations in their proteolytic and lipolytic activities (19, 25); therefore, all cultures should be examined for yield potential before being commercially marketed.

TYPES OF BULK STARTER MEDIA

Conventional bulk media

Traditionally, lactic bulk starter media were prepared from skim milk or nonfat dry milk (51). These bulk media were prepared by heating skim milk to a high temperature (89 to 95°C) for 5 to 30 min in order to commercially sterilize it. The heated milk was

cooled to 21°C, inoculated with about 1% stock culture, and incubated for 12 to 16 h at 21 to 26°C (55). This bulk starter was added to pasteurized milk. The amount of starter added varied between 0.5 and 5%, depending on the type of cheese being manufactured and the time desired from starter addition to cutting the coagulum (1, 11).

Inhibitory substances are a major problem in the conventional bulk starter media (1, 6, 45). Agglutinins are immune proteins present in milk that inhibit culture performance (6). Agglutinins may cause bacterial cells to agglutinate, resulting in localized acid production and formation of sludge at the bottom of cottage cheese vats (12). Cultures are also inhibited by antibiotics and are subject to bacteriophage attack (6). These factors influence the bacterial performance in conventional bulk media and can cause "dead" vats.

In past years, conventional bulk starter was prepared using several subculturing steps, followed by a period of incubation. These steps were performed on a daily basis and skilled personnel were needed to transfer and propagate stock cultures (51). Manufacturers who still use conventional bulk starters today inoculate them with bulksets from commercial culture houses. Therefore, the transfer of the mother culture is no longer necessary.

Cheese yield is also affected by the type of medium used for culture preparation (4, 5). Researchers have shown that bulk media cultures prepared from skim milk produce lower yields than the pre-concentrated direct-set cultures (21, 35, 42). Salji and Kroger (42) reported that conventional bulk starters of skim milk lost much of their casein with the whey. Ogden (35) found that up to 70% of the casein in the medium was hydrolyzed during bulk starter preparation and lost in the whey. Banks and Muir (4) found that during the preparation of skim milk medium

there was a chemical interaction between β -lactoglobulin and κ -casein in skim milk as a result of heat treatment. This interaction could inhibit the clotting action of rennet and cause yield loss, a problem that could be overcome by an acidification step (4, 5).

Acid injury is another problem with this medium. Studies have shown (10, 17) that when cheese starter cells grow in pH 5.0 or less, they become acid injured and therefore are unable to grow and produce rapidly when inoculated into milk. Wilkowske and Fouts (53) proposed a system for a continuous fermentation process in which the starter is grown in skim milk. The pH of the bulk starter controls the flow rate of the skim milk being added to the fermentation tank. The added skim milk buffers the bulk starter, maintains the pH above 5.2, and regulates the amount of bulk starter being removed from the fermentation tank. This system achieves the desired acidity level, thereby producing active starter cells. However, bacteriophage contamination and the development of undesirable mutants are major disadvantages of this system (53). Also, cell numbers in this system are lower than in other types of bulk starters.

Phage-inhibitory media

Since bacteriophages have been recognized as an important cause of conventional bulk starter failure (28, 29, 43), measures have been taken to prevent phage infection of bulk culture and to maintain an active starter culture (43). Phage-inhibitory medium (PIM) was introduced to overcome phage infection. This medium contained phosphate salts which chelate calcium ions (16, 55). Divalent cations (Ca^{2+}) are necessary for bacteriophage proliferation (9, 22, 55). Calcium allows phage to attach to the cell wall and is necessary for phage infection (22, 44). Calcium also facilitates notably

the injection of the phage DNA into the host (44, 55). Hargrove (15) observed that addition of phosphate to lactic starter medium bound the calcium so that phage proliferation in the lactic culture was inhibited. Hargrove et al. (16) reported that the best phosphate combination for phage inhibition was obtained when the medium contained 1.7% orthophosphate and 0.3% pyrophosphate salts. Kadis and Babel (26) confirmed that sodium and potassium orthophosphate would decrease phage proliferation in bulk starter medium. Moreover, phosphate salts buffer the medium, which allows for greater numbers of bacterial cells to grow, therefore producing starters that have greater activity (26).

Henning et al. (18) evaluated the first commercially prepared PIM manufactured in the United States. They indicated that the use of PIM provided protection for starter cultures against bacteriophage infection. Since then, several other companies have marketed similar media containing growth additives and phage-inhibitory salts. Gulstrom et al. (14) compared seven commercially available PIM for their ability to support bacterial growth and to prevent bacteriophage infection. They indicated that six of the seven PIMs tested were either ineffective in their ability to suppress phages or unable to support a reasonable growth of lactic cultures. They also concluded that the ability of a PIM to support bacterial growth and to suppress phage proliferation were two mutually exclusive properties.

Zottola and Marth (55) reported that all lactic strains were protected against bacteriophage when the phosphate salt concentration exceeded 1.6%. However, this inorganic phosphate had an inhibitory effect on some lactococcus cultures (31). Phosphate used to depress bacteriophage growth decreased cheese yield (14). Phosphate from bulk media increased milk protein solubility,

which increased the loss of protein in the whey (21). In addition, the cost of PIM accounted for approximately 70% of the total bulk starter culture costs (37).

External pH control media

In an effort to obtain a low-cost phage-inhibitory medium for propagation of lactic cultures, Richardson and his colleagues proposed the use of external pH control medium (ECM) (37, 38, 39). This bulk medium utilized a whey-based bacteriophage-inhibitory medium and pH control. It contained fresh sweet whey modified with 1.0% monoammonium phosphate, 1.9% disodium phosphate, and 0.32% yeast extract. The medium was heated at 89 to 95°C for 45 min. Inoculation followed with a suitable starter culture and incubation was carried out at 21°C. The culture tanks were equipped with pH electrodes that could withstand heat treatment to monitor acid development. Under this condition of pH control, media could be neutralized by injection of ammonium hydroxide to maintain a pH above 6.2 during starter growth (37). After about 16 h of pH-controlled growth, the starter was ready to use.

Increased starter activity and a reduced cost were the major advantages claimed for this type of bulk medium (37, 39). Inoculum level was reduced by 70 to 80% and the starter could be held without over-ripening acid development (38). ECM have a low phosphate level, thus enhancing milk clotting time, allowing for faster culture development and still providing protection against bacteriophage (2, 37). The pH-controlled whey-based system was used in the production of cottage- (36), Italian- and Swiss-cheese cultures (7, 37, 38).

Hicks et al. (21) compared cheese yield from different media (skim milk, enriched ammoniated whey, citrate-based, and phosphate-based media). When skim milk was used as bulk culture medium, a lower cheese yield was obtained.

On the other hand, a higher cheese yield was obtained with enriched ammoniated whey medium. Hicks et al. (21) also reported that an enriched ammoniated whey-based bulk culture was the most economical starter system of those tested.

Internal pH control media

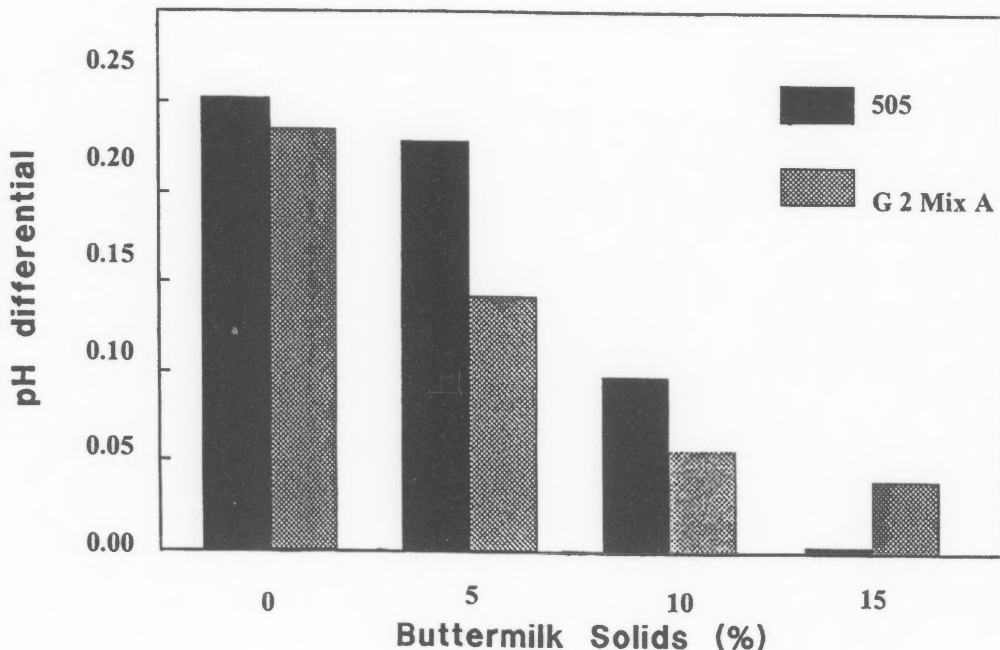
Following the development of external pH control medium, internal pH control medium (ICM) was introduced. Two U.S. patents were issued for a bulk starter medium in which lactic acid produced by starter cultures was neutralized through solubilization of buffers in the medium (46, 47). The ICM system prevented acid damage to starter bacteria and allowed greater cell numbers to be reached (33). In this system the bacteria were more active and a lower inoculation level could be used than in standard PIM bulk starter. No extra equipment or chemicals were needed for the preparation of the bulk medium (54). Other advantages included a built-in pH control, greater cost effectiveness, reduced manufacturing time, ease of use, and improved holding characteristics (33, 34, 54). Also, this medium is designed to suit the specific requirements of both mesophilic and thermophilic starter cultures (27, 46, 47).

One problem associated with ICM is agglutination (20, 23, 24, 41, 43, 52). Agglutination of the starter culture is the interaction of the bacterial cell wall with agglutinins in milk, resulting in formation of long bacterial chains or clumps of chains (20, 23, 24). Agglutination severity of starter culture depends on the presence of specific antigenic sites on the bacterial cell surface and on the agglutinin (lectins) titer in milk (12, 24, 41). Agglutination of lactococci has been known to be one of the main technological problems associated with the manufacturing of acid-coagulated cheeses (12, 24, 41). Therefore, many methods and techniques have been employed in an effort to control this problem.

Stadhouders (48) indicated that homogenization of skim milk decreased the agglutination problem. According to Grandison et al. (13), homogenization of skim milk before the addition of starter culture reduced agglutination of bacterial cells, eliminated minor sludge formation, and increased cheese yield. Also they recommended that skim milk homogenization should be considered by commercial cottage-cheese manufacturing plants to help solve agglutination problems. Russell-Campbell and Hicks (41) reported that homogenization of skim milk at 176 kg/cm² inhibited culture agglutination. This process was recommended as a practical method of controlling yield losses caused by agglutination. Hicks and Ibrahim (20) recommended homogenization of bulk culture as a practical method to prevent culture agglutination. When bulk starter culture was homogenized at 246 kg/cm² most of the cells in the culture were torn apart and agglutination was decreased. Homogenization of bulk starter allows for a more even pH development in skim milk. Homogenization of bulk culture could be practical for manufacturers who produce direct-set cultures. The homogenizer should be designed with steam-heated seals to insure sterility. However, this requires additional labor and additional cost in the preparation of starter culture. Previous research in our laboratory also has shown that addition of buttermilk solids (15%) to bulk media decreased the susceptibility of starter to agglutination (Figure 1) and reduced sludge formation.

Ustunol and Hicks (52) reported that culture agglutination was inhibited when starter cultures were grown in papain-treated whey medium. Microscopic examination showed that cultures grown in hydrolyzed whey medium formed diplococci or short chains. These chains were evenly distributed in the milk vats. It was proposed that hydrolyzed peptides produced in

Figure 1. Effect of buttermilk addition to bulk starter on agglutination behavior of mesophilic starter cultures (505 and G 2 mix A) as determined by pH differentials between top and bottom of skim milk ($n = 2$).



this medium may inhibit agglutination by binding onto the antigenic sites of the bacterial cell surface, thus preventing agglutinins from binding onto the same antigenic sites of bacterial cells. Agglutination-sensitive cultures formed long chains and had low protease activity, whereas agglutination-resistant cultures formed short chains and diplococci (24, 25). Increased chain length is believed to result from lowered proteolytic activity. This suggests that bacterial protease could be involved in the agglutination behavior of starter cultures and that the presence of active protease is required for cell growth and division; therefore, it could be an important element in prevention of culture agglutination (23, 24, 25). Ustunol and Hicks (52) showed that hydrolyzed peptides produced in papain-

treated whey medium decreased agglutination. These peptides and low-molecular weight substances may serve as exogenous supplies of amino acids which stimulate the growth of lactic starter cultures. It is well documented that lactic starter cultures are nutritionally fastidious and require extra amino acids which are essential for their initial growth (30). The amount of amino acids and low molecular weight peptides present in milk (0.1 mg/ml) are usually below the minimum requirement for active growth and acid production (30). The presence of active cell wall proteinase is required for the maintenance of bacterial growth. When the cell wall proteinase is inhibited in the presence of agglutinins, the addition of exogenous supplies of amino acids could

stimulate the growth of lactic acid bacteria and thus prevent long chain formation.

CONCLUSIONS

Many media are now available for the production of active starter cultures. Among these are internal pH control media, ICM. This type of medium has a greater cost effectiveness and reduces manufacturing time. Agglutination is a major problem associated with this type of medium. However, this problem can be overcome by homogenization of bulk starter media or by the addition of buttermilk solids. Further research and investigations are needed to study the biochemical characteristics of binding sites and mechanisms involved in preventing starter agglutination. New technology for improving ICM media is ongoing in our laboratory.

Acknowledgments

The authors gratefully acknowledge the financial support of the Deanship of Scientific Research at the University of Jordan.

REFERENCES

1. Anonymous. 1979. New cottage cheese cultures prove a processing boon. *Dairy Ice Cream Field* 162:60C.
2. Ausavanodom, N., R. S. White, R. Young, and G. H. Richardson. 1977. Lactic bulk culture system utilizing whey-based bacteriophage inhibitory medium and pH control II. Reduction of phosphate requirements under pH control. *J. Dairy Sci.* 60:1245-1251.
3. Babel, F. J. 1977. Antibiosis by lactic culture bacteria. *J. Dairy Sci.* 60:815-821.
4. Banks, J. M., and D. D. Muir. 1985. Incorporation of the protein from starter growth medium in curd during manufacture of cheddar cheese. *Milchwissenschaft* 40:209-212.
5. Banks, J. M., A. Y. Tamime, and D. D. Muir. 1985. The sufficiency of recovery of solids from bulk starter in Cheddar cheesemaking. *Dairy Ind.* 50:11, 13, 21.
6. Chandan, R. 1982. Selection, use of starter media plays vital cheese production role. *Dairy Rec.* March: 99-101.
7. Chen, Y. L., and G. H. Richardson. 1977. Lactic bulk culture system utilizing whey-based bacteriophage inhibitory medium and pH control. III. Applicability to cottage cheese manufacture. *J. Dairy Sci.* 60:1252-1255.
8. Christensen, V. W. 1972. Recent developments in starter techniques. *Dairy Ind.* 37:655-658.
9. Collins, E. B., F. E. Nelson, and C. E. Parmelee. 1950. The relation of calcium and other constituents of a deemed medium to proliferation of lactic streptococcus bacteriophage. *J. Bacteriol.* 60:533-542.
10. Cowell, G. R., J. A. Koburger, and S. J. Weese. 1966. Storage of lactic streptococci. I. Effect of pH on survival and endogenous metabolism in phosphate buffer. *J. Dairy Sci.* 49:365-369.
11. Crawford, R. J. 1972. Starter problems in the United Kingdom. *Dairy Ind.* 37:648-654.
12. Emmons, D. B., J. A. Elliott, and D. Beckett. 1966. Effect of lactic streptococcal agglutinins in milk on curd formation and manufacture of cottage cheese. *J. Dairy Sci.* 49:1357-1366.
13. Grandison, A. S., B. E. Brooker, P. Young, and S. Wigmore. 1986. Yield loss of cottage cheese curd due to the formation of minor sludge: the beneficial effect of homogenization. *J. Soc. Dairy Technol.* 39(4):123-126.
14. Gulstrom, T. J., L. Pearce, W. E. Sandine, and P. R. Elliker. 1979. Evaluation of commercial phage inhibitory media. *J. Dairy Sci.* 62:208-221.
15. Hargrove, R. E. 1959. A simple method for eliminating and controlling bacteriophage in lactic starters. *J. Dairy Sci.* 42:906.
16. Hargrove, R. E., F. E. McDonough, and R. P. Tittler. 1961. Phosphate heat treatment of milk to prevent bacteriophage proliferation in lactic cultures. *J. Dairy Sci.* 44:1799-1810.
17. Harvey, R. J. 1965. Damage to *Streptococcus lactis* resulting from growth at low pH. *J. Bacteriol.* 90(5):1330-1336.
18. Henning, D. R., C. H. Black, W. E. Sandine, and P. R. Elliker. 1968. Host range studies of lactic streptococcal bacteriophages. *J. Dairy Sci.* 51:16-21.
19. Hicks, C. L. 1990. Controlling fat losses in cheddar cheese. Paper no. 17, presented at 9th Biennial Cheese Industry Conference, Logen, UT, 21 to 23 August.
20. Hicks, C. L. and S. A. Ibrahim. 1992. Lactic bulk starter homogenization affects culture agglutination. *J. Food Sci.* 57:1086-1092.
21. Hicks, C. L., F. Marks, J. O'Leary, and B. E. Langlois. 1985. Effect of culture media on cheese yield. *Cult. Dairy Prod. J.* 20(3):9-11.
22. Huggins, A. R. 1985. Recent developments in starter culture technology. *Dairy Ind. Int.* 50:27-29, 31-32.
23. Ibrahim, S. A. 1995. Influence of proteolytic activity on agglutination behavior of mesophilic starter cultures. *Milchwissenschaft.* 50:488-492.
24. Ibrahim, S. A., and M. H. Daguri. 1995. Agglutination behavior of mesophilic starter cultures: A review. *Cult. Dairy Prod. J.* 30:28-31.
25. Ibrahim, S. A., and M. H. Daguri. 1995. Comparison of proteinase assays for mesophilic starter cultures. *J. Dairy Sci.* 78 (Suppl. 1): D140.
26. Kadis, V. W., and F. J. Babel. 1962. Effect of addition of phosphates to milk on development of bacteriophage and growth of lactic cultures. *J. Dairy Sci.* 45:432-435.
27. Khosravi, L., W. E. Sandine, and J. W. Ayres. 1991. Evaluation of newly-formulated bacteriophage inhibitory bulk starter medium for the cultivation of thermophilic lactic acid bacteria. *Cult. Dairy Prod. J.* 26(2):4-6, 8-9.
28. Klaenhammer, T. R. 1984. Interaction of bacteriophages with lactic streptococci. *Adv. Appl. Microbiol.* 30:1-29.
29. Lawrence, R., H. A. Heap, G. L. Limsowtin and A. Jarvis. 1978. Cheddar cheese starters: current knowledge and practices of phage characteristics and strain selection. *J. Dairy Sci.* 61:1181-1191.
30. Lawrence, R., T. Thomas and B. E. Terzaghi. 1976. Reviews of the progress of dairy science: cheese starters. *J. Dairy Res.* 43:141-193.
31. Ledford, R. A., and M. L. Speck. 1979. Injury of lactic streptococci by culturing in media containing high phosphates. *J. Dairy Sci.* 62:781-784.
32. Lowrie, R. J., R. C. Lawrence, and M. F. Peberdy. 1974. Cheddar cheese flavor. V. Influence of bacteriophage and cooking temperature on cheese made under controlled bacteriological conditions. *N. Z. J. Dairy Sci. Technol.* 9:116-121.
33. Mermelstein, N. H. 1982. Advanced bulk starter medium improves fermentation processes. *Food Technol.* 36(8): 69-76.
34. Morris, C. E. 1980. Breakthrough in starter medium. *Food Eng.* 52: 38-40.
35. Ogden, V. 1981. Whey starter for commercial cottage cheese. *J. Dairy Sci.* 64:53.
36. Reddy, K. P., and G. H. Richardson. 1977. Lactic bulk culture system utilizing whey-based bacteriophage inhibitory medium and pH control. IV. Applicability to Italian and Swiss cheese cultures. *J. Dairy Sci.* 60:1527-1531.
37. Richardson, G. H., C. T. Cheng, and R. Young. 1977. Lactic bulk culture system utilizing whey-based bacteriophage inhibitory medium and pH control. I. Applicability to American style cheese. *J. Dairy Sci.* 60:378-386.
38. Richardson, G. H., and C. A. Armstrong. 1979. USU lactic culture system. *Utah Sci.* 40:94-99.
39. Richardson, G. H., and L. E. Pearce. 1976. A laboratory batch fermenter with differential electrode pH control. *N. Z. J. Dairy Sci. Technol.* 11:83-87.
40. Robinson, R. K. 1981. Freeze-dried starter concentrates. I. Their characteristics and potential application to the production of cheese and yogurt. *Dairy Ind.* 46:15, 17, 19, 21.
41. Russel-Campbell, E., and C. L. Hicks. 1992. Culture agglutination as affected by homogenization of skim milk. *J. Dairy Sci.* 75:3282-3288.
42. Salji, J. P., and M. Kroger. 1981. Effect of using frozen concentrated direct to vat culture on the yield and quality of cheddar cheese. *J. Food Sci.* 46:920-924.
43. Sandine, W. E. 1977. New techniques in handling lactic cultures to enhance their performance. *J. Dairy Sci.* 60:822-828.

44. Sandine, W. E. 1989. Use of bacteriophage-resistant mutants of lactococcal starters in cheesemaking. *Neth. Milk Dairy J.* 43:211-219.
45. Sandine, W. E., A. W. Anderson, and P. R. Elliker. 1957. How to avoid floating curd when making cottage cheese. *Food Eng.* 29:84-90.
46. Sandine, W. E., and J. W. Ayres. 1983. Method and starter compositions for the growth of acid producing bacteria and bacterial composition produced thereby. U.S. patent 4, 382, 965.
47. Sinkoff, B. A., and R. H. Bundus. 1983. Bulk starter media. U.S. patent 4, 402, 986.
48. Stadhouders, J. 1963. The inhibitory effect of lactenin L3 on acid production in milk by *Streptococcus cremoris* 803. *Neth. Milk Dairy J.* 17:96-116.
49. Terzaghi B. E., and W. E. Sandine. 1975. Improved medium for lactic streptococci and their bacteriophages. *Applied Microbiol.* 29:807-813.
50. Thunell, R. K., W. E. Sandine, and F. W. Bodyfelt. 1981. Phage insensitive, multiple-strain starter approach to Cheddar cheese making. *J. Dairy Sci.* 64:2270-2277.
51. Thunell, R. K., W. E. Sandine, and F. W. Bodyfelt. 1984. Frozen starters from internal-pH-control-grown cultures. *J. Dairy Sci.* 67:24-36.
52. Ustunol, Z., and C. L. Hicks. 1994. Use of an enzyme-treated, whey-based medium to reduced culture agglutination. *J. Dairy Sci.* 77:1479-1485.
53. Wilkowske, H. H., and E. L. Fouts. 1958. Continuous and automatic propagation of dairy cultures. *J. Dairy Sci.* 41:49-56.
54. Willrett, D. L., W. E. Sandine, and J. W. Ayres. 1980. Evaluation of a new pH controlled bulk starter medium. *Am. Dairy Rev.* 42:46A-46B, 46D, 46F-46G.
55. Zottola, E. A., and E. H. Marth. 1966. Dry-blended phosphate treated milk media for inhibition of bacteriophages active against lactic streptococci. *J. Dairy Sci.* 49:1343-1349.

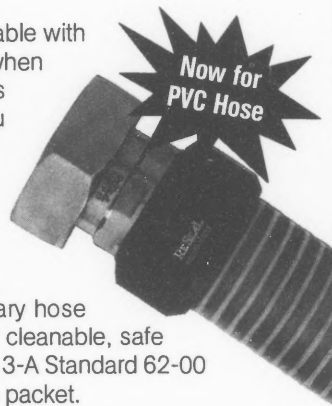
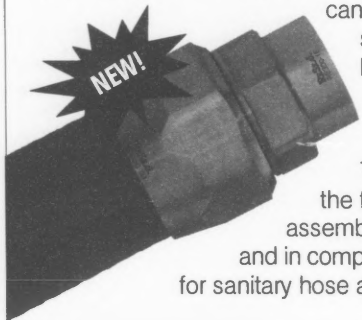
Totally Sanitary Totally Reusable



The New RESEAL™ Sanitary Hose System

A totally sanitary environment for your food or beverage product, now available with the cost-savings of reusable ends! That's right. With the ReSeal™ system, when your hose assembly gets kinked, run over or simply wears out, the couplers can be reattached to a new length of hose. You still have to buy the hose . . . but you don't have to buy new couplers. That's usually a savings of 50% to 90% over the price of a complete new assembly!

The innovative ReSeal™ system provides all the features you've come to expect in a sanitary hose assembly: sanitary full-flow compression seal, CIP cleanable, safe and in compliance with regulatory standards — including 3-A Standard 62-00 for sanitary hose assemblies. Call today for a free information packet.



Nelson-Jameson, Inc.
2400 E. 5th St., P.O. Box 647
Marshfield, WI 54449

Phone 800/826-8302

FAX 800/472-0840

Reader Service No. 173

Awards Nominations

The International Association of Milk, Food and Environmental Sanitarians is proud of its members and their contributions. Whether you are a member of IAMFES or not, you may nominate deserving colleagues for IAMFES Awards.

NOMINATION FORMS MAY BE OBTAINED FROM:

David M. Merrifield
IAMFES, Awards
6200 Aurora Avenue, Suite 200W
Des Moines, IA 50322-2863

Be sure to tell us which award(s) you will be making a nomination. Each award nomination form is different. Questions? Call 515-276-3344; 800-369-6337, 8:00 a.m.-4:30 p.m. central time weekdays, or FAX 515-276-8655.

Nomination forms need to be completed and returned to the Des Moines office by February 14, 1997.

1. Previous award winners are not eligible for the same award.
2. Current Executive Board members are not eligible for nomination.
3. Persons nominated for individual awards must be current IAMFES members. (For the Black Pearl Award, the company must have employees with active IAMFES membership.)

Presentation of these awards will be made during the Annual Awards Banquet on July 9, 1997 in Orlando, FL.

- **Harry Haverland Citation Award — \$1000 Award and Plaque**
Recognizes an individual for many years of devotion to the ideals and objectives of the association. Sponsored by DiverseyLever Corporation.
- **Honorary Life Membership Award — Plaque and Lifetime Membership with IAMFES**
For an individual's devotion to the high ideals and principles of IAMFES.
- **Black Pearl Award — Black Pearl, Hand-Crafted Sculpture with Mounted Black Pearl**
Recognizes a company for its outstanding achievement in corporate excellence in food safety and quality. Sponsored by Wilbur Feagan and F & H Food Equipment Company.
- **Harold Barnum Industry Award — \$1000 Award and Plaque**
Recognizes an individual for outstanding service to the public, IAMFES and the profession of the Sanitarian. Sponsored by Nasco International, Inc.
- **Educator Award — \$1000 Award and Plaque**
Presented to an educator in recognition of outstanding service in academic contributions to the profession of the Sanitarian. Sponsored by IBA, Inc.
- **Sanitarian Award — \$1000 Award and Plaque**
Recognizes an individual for outstanding service to the profession of the Sanitarian. Sponsored by Ecolab, Inc., Food and Beverage Division.

I A M F E S

1

9

9

7

Nominate a
deserving
colleague or
company for
one or more of
these prestigious
IAMFES Awards

Book reviewed by: Steve Taylor, University of Nebraska, Lincoln, NE

Book Review



"Food Allergies and Intolerances"

Edited by:

Gerhard Eisenbrand, Holger Aulepp, Anthony David Dayan, Peter Stefan Elias,
Werner Grunow, Johannes Ring and Josef Schlatter

Food *Allergies and Intolerances* is a soft-bound volume that is the proceedings of a symposium held in May, 1995 in Germany. The symposium was held under the auspices of the Senate Commission on Food Safety of the German government. The goal of the symposium was to assess the state of current knowledge and identify gaps in that body of research information.

Food Allergies and Intolerances is a relatively short book of only 231 pages. The book is divided into several sections. The first section is a series of executive summaries of the symposium presentations in German. The following sections in English are: (1) Clinical Aspects, Epidemiology, Validity of Data, (2) Molecular Basis of Allergenicity and Allergen Characterization, (3) The Input of Molecular Biology: Transgenic Foods, (4) Strategies for Safety Evaluation, and (5) Main Conclusions and Recommendations. The final three sections of the volume will undoubtedly hold the most interest to readers of *Dairy, Food and Environmental Sanitation*. The greatest value of this book will be to those in the biotechnology industry and those government regulators who are concerned with the establishment of policies regarding the commercialization of transgenic foods.

The first section of the English portion of the book provides an excellent, though brief, summary of the clinical aspects of food allergies. The chapters on the prevalence of food allergies emphasize the weaknesses in current estimates but provide little new information on the true prevalence of food allergies. This section

also contains excellent chapters on the symptoms associated with food allergies and on the diagnosis of food allergies. The final chapter in this section on the significance of the route of exposure is a bit controversial. The chapter claims that allergic sensitization via the gastrointestinal tract is probably unusual in subjects older than 2 years of age. Certainly, I believe that allergies to foods such as shellfish are most likely to develop by gastrointestinal sensitization at ages of older than 2. While the author of this chapter emphasizes the potential importance of respiratory exposure in sensitization, I am not ready to dismiss the importance of gastrointestinal sensitization.

The next section of the book contains a series of chapters on the molecular basis of allergenicity and allergen characterization. These chapters will serve as excellent summaries of a rather complex field of study for scientists who are already fairly knowledgeable in this area. However, this shortened presentation does not even attempt to provide a scientific foundation for those who may not already understand the basics of food allergy. For some who specialize in the area of food allergies a table on page 132 provides an outstanding summary of allergens from plant sources and their stability to processing treatments. However, other than this table, the book does not provide a thorough review of the effects of food processing on allergens. The final chapter in this section is on allergens emanating from indoor and outdoor molds which seems inappropriate for this volume.

The next two sections of the book present some very interesting information on the evaluation of the allergenicity of transgenic foods. The potential allergenicity of transgenic foods is an area of some regulatory concern in Europe so this book will provide some useful insights. The first chapter is a description of the development of transgenic rice with reduced allergenic potential; this is the first description of the down-regulation of allergens in foods through biotechnology which has been accomplished by a group of Japanese investigators. The other chapter in this section deals with transgenic fish, but the examples cited seem unlikely to present any increased allergenic risk. The final section begins with an outstanding chapter on an approach to the evaluation of allergenicity of transgenic foods. This chapter offers many potentially useful approaches to the allergenicity assessment of transgenic foods and the novel proteins that they might contain. The final three chapters describe examples of the assessment of the allergenicity of transgenic foods. The first is a description of a transgenic soybean containing a protein from Brazil nut which turned out to be a

major Brazil nut allergen; this was the first demonstration of the allergenicity of a transgenic food. The second of these chapters deals with industrial enzymes used in food processing; several enzymes used in food processing are important occupational allergens. The final chapter deals with the assessment of the allergenicity of the glyphosate-resistant soybean which is highly unlikely to present any new allergenic risk to consumers.

The final section contains the Main Conclusions and Recommendations of the symposium. This section offers recommendations for future research directions, industry opportunities, and regulatory options.

Food Allergy and Intolerance is recommended reading for individuals in the biotechnology industry and those in regulatory affairs positions in the food industry. However, it does not contain sufficient introductory information to be recommended to those who do not already have a good understanding of food allergies and the issues regarding food allergies that are facing the food industry.

For copies of "Food Allergies and Intolerances":

Mail requests to: VCH Publishers, Inc., 220 E. 23rd St., New York, NY 10010-4606

ATTENTION AUTHORS

The Editors are seeking articles of general interest and applied research with an emphasis on food safety for publication in **Dairy, Food and Environmental Sanitation**

Submit your articles to:

**Managing Editor, Dairy, Food and Environmental Sanitation, c/o IAMFES, Inc.,
6200 Aurora Ave., Suite 200W
Des Moines, Iowa 50322-2863**

Please submit three copies of manuscripts along with a fourth copy on 3 1/2" computer disk.

New Members

AUSTRALIA

David Laboyrie
Microtech Laboratories
Greenacre NSW

CANADA

Glen Hudgin
Mastings & Prince Edward Cos.
Health Unit, Belleville, Ontario

Michel Simard
Universite Laval, Ste-Foy, Quebec

Nancy Wang
TDI Projects, Edmonton, Alberta

SAUDI ARABIA

Ibrahim S. Al-Mohizea
King Saud University, Riyadh

SINGAPORE

Doris Ng
Food & Water Microbiology
Laboratory, Singapore

UNITED STATES

ALABAMA

John Y. Lu
Tuskegee University, Tuskegee

ALASKA

B. Balinger
Anchorage School District
Anchorage

ARKANSAS

Cesar M. Compadre
University of Arkansas Medical
Science, Little Rock

CALIFORNIA

Jeff Gurican
Bakersfield

Gregory Inami
California Dept. of Health Services
Oakland

Steve Nason
Medical Packaging Corp., Camarillo

Greg Peterson
Safeway, Inc., Walnut Creek

FLORIDA

Danny D. Horner
FISA, Miami

ILLINOIS

Paul M. D. Nardo
al GELATO, Franklin Park

Rex Still
McDonough County Health Dept.
Macomb

INDIANA

Steve Thomas
Tetra-Pak, Fort Wayne

MARYLAND

Donna Stearns
Perstorp Analytical, Silver Springs

MINNESOTA

Sean Teske
Chaska Chemical Co., Inc., Savage

MISSOURI

Michael Westendorf
Enviro-Chem Systems, Chesterfield

NORTH CAROLINA

Michael D. Goodyear
USDA-FSIS, Chapel Hill

OHIO

Richard P. Laird
Gojo Industries, Akron

PENNSYLVANIA

Kenneth A. Berkich
Quaker Oats Co., Shiremanstown

Michael L. Lapioli
Quaker Oats Co., Shiremanstown

Douglas K. Miscikowski
Quaker Oats Co., Shiremanstown

TEXAS

Tim Kayfus
Brinker International, Dallas

Cathy Odinet
Albertson's Inc., Fort Worth

New IAMFES Sustaining Member

Christopher Catani
Hardy Diagnostics
Santa Maria, CA

Affiliate Officers

ALABAMA ASSN. OF MILK, FOOD & ENVIRONMENTAL SANITARIANS

Pres., Ronnie Sanders Montgomery
Pres. Elect, Lance Hester Montgomery
Vice Pres., Ed Mabry Cowarts
Sec'y. Treas., Patricia Lindsey ... Guntersville
Past Pres., Ken Reamer Montgomery
Delegate, G. M. Gallaspy Montgomery

Mail all correspondence to:
Patricia Lindsey
Marshall County Health Dept.
P.O. Drawer 339
Guntersville, AL 35976
(205)582-4926

ALBERTA ASSN. OF MILK, FOOD & ENVIRONMENTAL SANITARIANS

Pres., Tony Warwaruk Edmonton
Past Pres., Mike Mavromaras .. Edmonton
Pres. Elect, Doug Karlson Edmonton
Sec'y., Gary Gensler Edmonton
Treas., Bonnie Jensen Edmonton

Mail all correspondence to:
Mike Mavromaras
Regional Dairy Specialist
Alberta Agriculture
O.S. Longman Building, 3rd Flr.
6909-116 St.
Edmonton, Alberta, Canada T6H 4P2
(403)427-2450

CALIFORNIA ASSN. OF DAIRY & MILK SANITARIANS

Pres., Les Wood Benicia
Past Pres., John Jackson LaHabra
1st Vice Pres., Ed Wensel Livermore
2nd Vice Pres., Gary Timmons . Ontario
Exec. Sec'y. Treas., John Bruhn ... Davis
Recording Sec'y., Anne Quilter Goldstein
..... San Rafael
Delegate, John Bruhn Davis

Mail all correspondence to:
Dr. John Bruhn
Department of Food Science
& Technology
101B Cruess Hall
University of California - Davis
Davis, CA 95616-8598
(916)752-2191

CAROLINA'S ASSN. OF MILK, FOOD & ENVIRONMENTAL SANITARIANS

Pres., Kay Sigmon Mooresville, NC
Vice Pres., Felix Barron Clemson, SC
Sec'y., Tom Williamson Raleigh, NC
Treas., Joe Neely Columbia, SC
Delegate, Beth Johnson Columbia, SC

Mail all correspondence to:
Kay Sigmon
NCDEHNR
919 N. Main St.
Mooresville, NC 28115
(704)663-1699

CONNECTICUT ASSN. OF DAIRY & FOOD SANITARIANS, INC.

Pres., Colleen Mears Windsor Locks
Vice Pres., David Herrington
..... Middlefield
Sec'y., Donald Shields Hartford
Treas., Kevin Gallagher Hartford
Delegate, Satyakam Sen Bristol

Mail all correspondence to:
Kevin Gallagher
Dept. Consumer Protection
(Food Div.)
State Office Bldg., Rm #167
165 Capitol Avenue
Hartford, CT 06106
(203)566-4716

FLORIDA ASSN. OF MILK, FOOD & ENVIRONMENTAL SANITARIANS, INC.

Pres., Marian Ryan Winter Haven
Pres. Elect, Faith Holcm Lakeland
Vice Pres., Buddy Levins Longwood
Past Pres., Kathleen Ward .. Jacksonville
Sec'y., Faith Holcm Lakeland
Treas., Bill Thornhill Winter Haven
Delegate, Peter Hibbard Orlando

Mail all correspondence to:
Bill Thornhill
3023 Lake Alfred Road
Winter Haven, FL 33881
(941)299-6555

GEORGIA ASSN. OF FOOD & ENVIRONMENTAL SANITARIANS

Pres., Yao-wen Huang Athens
Vice Pres., Ed Giera Atlanta
Past Pres., Debbie Chapman Atlanta
Sec'y., Judy Harrison Athens
Treas., James C. Camp Newnan
Delegate, David Fry Lilburn

Mail all correspondence to:
Judy Harrison
GAFES Secretary
Cooperative Extension Service
Hoke-Smith Annex,
University of Georgia
Athens, GA 30602
(706)842-8865

IDAHO ENVIRONMENTAL HEALTH ASSN.

Pres., Edgar Hale Coeur d'Alene
Pres. Elect, Edward Marugg Pocatello
Past Pres., Steve Bastian Preston
Sec'y. Treas., Tom Hepworth . Pocatello
Delegate, Edgar Hale Coeur d'Alene

Mail all correspondence to:
Tom Hepworth
Fort Hall SLF,
1500 N. Fort Hall Mine Rd.
Pocatello, ID 83204
(208)236-0607

ASSOCIATED ILLINOIS MILK, FOOD & ENVIRONMENTAL SANITARIANS

Pres., Alan Lundin Cherry Valley
Pres. Elect, Wayne Knudson .. Glenview
1st Vice Pres., Karen Engebretson
..... Rockford
2nd Vice Pres., Gary Kuhlmann
..... Springfield
Sec'y. Treas., Robert Crombie Joliet
Past Pres., Doug Cart Rockford
Delegate, Charles Price Lombard

Mail all correspondence to:
Robert Crombie
The Crombie Company
521 Cowles Avenue
Joliet, IL 60435
(815)726-1683

INDIANA ENVIRONMENTAL HEALTH ASSN., INC.

Pres., Sylvia Garrison Bloomington
 Pres. Elect, Cyndi Wagner Indianapolis
 Vice Pres., Stephanie Dunlap Indianapolis
 Treas., Don Artmeier Bloomington
 Sec'y., Janice Wilkins Muncie
 Past Pres., Deanna English Danville
 Delegate, Helene Uhlman Hammond
 Auditor, E. Patience McGruder Lafayette
 Auditor, Matthew Galbraith Columbus

Mail all correspondence to:
 Indiana Environmental Health Assoc.
 Attn: Tammi Barrett-Coomer
 P.O. Box 457
 Indianapolis, IN 46206-0457
 (317)383-6168

IOWA ASSN. OF MILK, FOOD & ENVIRONMENTAL SANITARIANS, INC.

Pres., Herb Belz Slater
 Pres. Elect, Norieta Kramer Waterloo
 Past Pres., Loren Johnson Le Mars
 Sec'y. Treas., Monica Streicher Arlington
 Delegate, Randy Hanson Dubuque

Mail all correspondence to:
 Monica Streicher
 3281 40th Street
 Arlington, IA 50606
 (319)933-4521

KANSAS ASSN. OF SANITARIANS

Pres., Dan Hutchinson Topeka
 Past Pres., George Blush Topeka
 1st Vice Pres., Marvin Simonton Wellington
 2nd Vice Pres., Joseph Malinowski Junction City
 Sec'y., Galen Hulsing Topeka
 Treas., Jerry McNamar Kiowa
 Delegate, Don Bechtel Manhattan

Mail all correspondence to:
 Galen Hulsing
 Topeka-Shawnee County Health Agency
 1615 S.W. 8th Street
 Topeka, KS 66606
 (913)295-3650

KENTUCKY ASSN. OF MILK, FOOD & ENVIRONMENTAL SANITARIANS, INC.

Pres., Keith Brock Lebanon
 Pres. Elect, Ed Cecil Owensboro
 Vice Pres., Jim Wesley Somerset
 Past Pres., Guy Delius Frankfort
 Sec'y., Pam Kuist Princeton
 Treas., Judy True Frankfort
 Delegate, David Klee Elizabethtown

Mail all correspondence to:

Judy True
 Local Health Personnel
 275 East Main Street
 Frankfort, KY 40621
 (502)564-3796

MASSACHUSETTS MILK, FOOD & ENVIRONMENTAL INSPECTORS ASSN.

Pres., David Kochan Northampton
 Past Pres., Max Bookless Pittsfield
 Vice Pres., Gail Lawrence Springfield
 Sec'y. Treas., Fred Kowal Chicopee
 Delegate, Barb Kulig West Springfield

Mail all correspondence to:
 Fred Kowal
 45 Beaumont Avenue
 Chicopee, MA 01013
 (413)592-5914

METROPOLITAN ASSN. OF DAIRY, FOOD AND ENVIRONMENTAL SPECIALISTS

Pres., Eileen Wachowski New Rochelle, NY
 Past Pres., Donald Hammer Marlton, NJ
 1st Vice Pres., Gloria Dougherty Montague, NJ
 2nd Vice Pres., Carol A. Schwar Alpha, NJ
 Sec'y. Treas., Dennis Tidwell Hamilton, NJ
 Delegate, Fred Weber Hamilton, NJ

Mail all correspondence to:
 Fred Weber
 2732 Kuser Road
 Hamilton, NJ 08691-9430
 (609)584-7677

MICHIGAN ENVIRONMENTAL HEALTH ASSN.

Pres., Chuck Lichon Midland
 Pres. Elect, Janet Morlick Flint
 Past Pres., Dick Fleece Manchester
 Treas., Bruce DuHamel Corunna
 Sec'y., Tom Olson Holland
 Delegate, Chuck Lichon Midland

Mail all correspondence to:
 Chuck Lichon
 220 W. Ellsworth
 Midland, MI 48640
 (517)832-6656

MINNESOTA SANITARIANS ASSN., INC.

Pres., Dan Erickson St. Paul
 Pres. Elect, Elaine Santi Iron
 Vice Pres., Mike Pronchinske Preston
 Sec'y. Treas., Paul Nierman St. Paul
 Past Pres., Greg Pittman Montgomery
 Delegate, Paul Nierman St. Paul

Mail all correspondence to:

Paul Nierman
 Dairy Quality Control Institute
 5205 Quincy Street
 Mounds View, MN 55112-1400
 (612)785-0484

MISSISSIPPI ENVIRONMENTAL HEALTH ASSN.

Pres., Dana Carson Meridian
 Pres. Elect, Brenda Clark Gulfport
 1st Vice Pres., Robert Course Greenwood
 2nd Vice Pres., Charlie Busler Meridian
 Sec'y. Treas., Donna Fareyaldenhoven Meridian
 Past Pres., Kenneth Bruce Akerman
 Delegate, Dana Carson Meridian

Mail all correspondence to:

Dana Carson
 Environmental Health Lauderdale
 Co. Health
 P.O. Box 4419
 Meridian, MS 39304
 (601)693-2451

MISSOURI MILK, FOOD & ENVIRONMENTAL HEALTH ASSN.

Pres., Dianna Pasley Hillsboro
 Pres. Elect, David Gailey Jefferson City
 Vice Pres., Don Falls Jefferson City
 Sec'y., Linda Wilson Springfield
 Treas., Patrick Shannon Jefferson City
 Past Pres., Janet Murray Moberly
 Delegate, Dianna Pasley Hillsboro

Mail all correspondence to:

Dianna Pasley
 Jefferson County Health Department
 P.O. Box 0437
 Hillsboro, MO 63050
 (314)789-3372

NEBRASKA ASSN. OF MILK & FOOD SANITARIANS

Pres., Curt Sales Lincoln
 Vice Pres., Michelle Westland Lincoln
 Sec'y. Treas., Roger Biltorf Lincoln
 Past Pres., Greg Henn Lincoln
 Delegate, Susan Sumner Lincoln

Mail all correspondence to:

Michelle Westland
 Laboratory, Douglas Co.
 Health Dept.
 1819 Farnam St.
 Omaha, NE 68183
 (402)444-7496

**NEW YORK STATE ASSN.
OF MILK & FOOD SANITARIANS**

Pres., Charles Richardson Baldwinsville
Pres. Elect, William Byrne, Jr. ... Syracuse
Past Pres., Ronald Gardner Ithaca
Exec. Sec'y., Janene Lucia Ithaca
Delegate, Terry Musson Keyport, NJ

Mail all correspondence to:

Janene Lucia
Cornell University
172 Stocking Hall
Ithaca, NY 14853
(607)255-2892

**NORTH DAKOTA
ENVIRONMENTAL HEALTH ASSN.**

Pres., Allen McKay Devils Lake
1st Vice Pres., Kevin Misek Rugby
2nd Vice Pres., Mike Walton ... Bismarck
Past Pres., Dan Mattern Bismarck
Sec'y. Treas., Deb Larson Bismarck
Delegate, Bob Dykeshoorn Bismarck
Member-at-Large, Jim Schothorst
..... Grand Forks

Mail all correspondence to:

Debra Larson
State Dept. of Health
600 E Blvd. Ave.
Bismarck, ND 58505-0200
(701)328-1292

**OHIO ASSN. OF MILK, FOOD
& ENVIRONMENTAL SANITARIANS**

Pres., Roger Tedrick Columbus
Pres. Elect, Barry Pokorny Cincinnati
1st Vice Pres., Gloria Swick Columbus
2nd Vice Pres., James Baker Lancaster
Sec'y. Treas., Don Barrett Columbus
Past Pres., Greg DeLong Dayton
Delegate, Gloria Swick Columbus

Mail all correspondence to:

Donald L. Barrett
Health Dept.
181 S. Washington Blvd.
Columbus, OH 43215
(614)645-6195

**ONTARIO FOOD PROTECTION
ASSOCIATION**

Pres., Sue Fraser Ontario
Vice Pres., Debbie Labelle Kitchener
Sec'y., Joan Wakeman Hamilton
Treas., Helen Hingston Ontario
Past Pres., Anna Lammerding Guelph
Delegate, Sue Fraser Ontario

Mail all correspondence to:

Sue Fraser
Janes Family Foods Limited
2160 Highway 7
Concord, Ontario L4K 1W6
(905)669-1648

**PENNSYLVANIA ASSN. OF MILK,
FOOD & ENVIRONMENTAL
SANITARIANS**

Pres., Jacqueline Hornack Hazleton
Pres. Elect, Craig Weaver Stoystown
Vice Pres., Patrick Campbell Ambridge
Sec'y., Eugene Frey Lancaster
Treas., Robert Mock New Berlinville
Past Pres., Clifford Kendall Altoona
Delegate, Eugene Frey Lancaster

Mail all correspondence to:

Eugene Frey
Atlantic Dairy Cooperative
629 N. Marshall St.
Lancaster, PA 17602
(717)397-0719

**SOUTH DAKOTA ENVIRONMENTAL
HEALTH ASSN.**

Pres., Rich McEntaffer Pierre
Pres. Elect, Rex Van Den Berg Pierre
Past Pres., Bill Chalcraft Pierre
Sec'y. Treas., Scott Hipple Pierre
Delegate, Darwin Kurtenbach Pierre

Mail all correspondence to:

Scott Hipple
SD State Department of Health
445 E. Capitol
Pierre, SD 57501-3185
(605)773-3364

**TENNESSEE ASSN. OF MILK,
WATER & FOOD PROTECTION**

Pres., Gail Smith Chattanooga
Pres. Elect, Dwan Patterson Brentwood
1st Vice Pres., Suzie Sykes Little Rock, AR
Sec'y. Treas., Dennis Lampley Bon Aqua
Bd. Mem. at Lge., Jim Byington .. Blountville
Past Pres., Genevieve Christen ... Knoxville
Delegate, Ruth Fuqua Mt. Juliet

Mail all correspondence to:

Dennis Lampley
7346 Sack Lampley Road
Bon Aqua, TN 37025
(615)360-0157

**TEXAS ASSN. OF MILK, FOOD
& ENVIRONMENTAL SANITARIANS**

Pres., Jaime Cantu Corpus Christi
Past Pres., Don Ritch Dallas
Sec'y. Treas., Ron Richter College Station
Archivist, Joe Goddard Lubbock
Delegate, Janie Parks Austin

Mail all correspondence to:

TAMFES
Ron Richter
Dept. of Animal Science, Texas A & M
College Station, TX 77843-2471
(409)845-4409

**VIRGINIA ASSN. OF SANITARIANS
& DAIRY FIELDMEN**

Pres., Bennett Minor Mechanicsville
1st Vice Pres., Michael Hodges
..... Martinsville
Sec'y. Treas., David Dansey Richmond
Past Pres., Randy Osborn Independence
Delegate, David Dansey Richmond

Mail all correspondence to:

David Dansey
Box 1163
Richmond, VA 23209-1163
(804)786-1452

**WASHINGTON MILK & FOOD
SANITARIANS ASSN.**

Pres., Jim Watkins Lake Tapps
Pres. Elect, Greg Rood Roy
Past Pres., Stephanie Olmsted Seattle
Sec'y. Treas., Lloyd Luedecke ... Pullman
Delegate, Lloyd Luedecke Pullman

Mail all correspondence to:

Lloyd Luedecke
NW 312 True Street
Pullman, WA 99163
(509)335-4016

**WISCONSIN ASSN. OF MILK
& FOOD SANITARIANS**

Pres., Bill Wendorff Madison
Pres. Elect, Phil Hermsen Shawano
Past Pres., Fritz Buss Marshfield
1st Vice Pres., Amy J. Bender
..... Richland Center
Sec'y., Randall Daggs Sun Prairie
Treas., Neil Vassau Madison
Delegate, Joseph Disch Madison

Mail all correspondence to:

Neil M. Vassau
P.O. Box 7883
Madison, WI 53707
(608)267-3504

**WYOMING ENVIRONMENTAL
HEALTH ASSN.**

Pres., Stephanie Whitman Laramie
Pres. Elect, Laurie Leis Casper
Sec'y., Shirley Etzell Lander
Treas., Jennifer Rucinski Laramie
Past Pres., Terry Carlile Evanston
Delegate, Laurie Leis Casper

Mail all correspondence to:

Laurie Leis
473 Trigood Drive
Casper, WY 82609
(307)266-1203

UpDates

Jim Sargent, Ph.D. Joins Copesan Services as Corporate Entomologist

Copesan Services is pleased to announce the addition of Jim Sargent, Ph.D. to its staff as Corporate Entomologist. As Corporate Entomologist for Copesan, Jim will actively participate in Copesan's National Account Sales and Quality Assurance efforts with technical and training support.

Jim's experience includes over 20 years of providing pest control technical assistance for the food industry. For the past 13 years Jim was with Great Lakes Chemical Corporation as Entomologist and Midwest Technical Coordinator and most recently as Technical Services Coordinator. Prior to this, he was an extension Entomologist at Ohio State University.

Jim has performed extensive consulting with several major food processors to develop pest management programs. Jim has also been actively involved in various associations, including the National Pest Control Association (NPCA) and the Entomological Society of America.

Cotruvo Joins NSF as Senior Regulatory Executive

NSF International announced Dr. Joseph A. Cotruvo has joined the organization as Senior Regulatory Executive. Dr. Cotruvo will be working from NSF's Washington, D.C. office on assignment from the EPA under the Intergovernmental Personnel Act (IPA).

Under the IPA partnership agreement with the EPA, Dr. Cotruvo will, among other duties,

assist NSF in the expansion of its consensus standards and certification programs. Consistent with the National Technology Transfer Act, EPA feels the expansion of consensus standards will reduce the need for federal standards and government oversight while ensuring improved health and environmental quality.

Dr. Cotruvo brings to NSF twenty-three years of experience in public health safety and environmental sciences in the regulatory community. Receiving his doctorate from Ohio State University in physical organic chemistry, and post doctorate in heterocyclic chemistry through the Italian National Research Council Fellowship, Bologna, Italy, Joe began his career in R&D with ChemSampCo in 1970. In 1973 he joined the staff at the U.S. Environmental Protection Agency (USEPA), Office of Planning and Evaluation, as Senior Analyst on Toxics, Pesticides, Clean Water and Drinking Water Acts.

Promoted to Director, Criteria and Standards Division, Office of Drinking Water in 1976, Dr. Cotruvo developed the first health effects guidance advisory service for States and public water systems to provide rapid assistance in the event of drinking water contamination incidents and was responsible for development and promulgation of National Drinking Water Quality Standards and Guidelines for chemicals, biologicals and radionuclides under the Safe Drinking Water Act. In 1990, Joe was appointed Director, Health and Environmental Review Division, Office of Pollution Prevention and Toxins; and, in 1992, appointed Director, Chemical Screening and Risk Assessment Division.

DFISA Welcomes CFO

The Dairy & Food Industries Supply Association (DFISA) is pleased to announce the appointment of Daniel (Dan) J. Hilleary as Chief Financial Officer. Hilleary, who has 17 years of experience including Chief Financial Officer and Chief Operating Officer in both for-profit and not-for-profit environments, will report directly to John M. Martin, President.

His expertise ranges from budgeting, strategic planning, finance and accounting, cash management, risk management to information systems, administration, facilities management and staff development. His most recent position has been as the Director, Finance & Administration for the Business & Professional Women's organization and for the BPW Foundation.

Hilleary, who resides in Warrenton, VA, with his wife and two children, has an MBA, Finance/Information Systems from George Mason University and a BSBA in Accounting from Georgetown University.

New Consumer Health Services Manager In Place

A public health officer who began his career 18 years ago in Natrona and Converse County has returned to Wyoming to manage the state's consumer health program. Chuck Higgins began his duties as Manager of the Consumer Health Services Section for the Wyoming Department of Agriculture (WDA) on Sept. 3.

During the summer of 1978, he served his internship with the Casper/Natrona County Health

Dept. and then began his public health career as the Deputy Health Officer and County Sanitarian for the Converse County Health Department in August, 1978. Prior to his return to Wyoming, Higgins was the Training Officer for the Food and Drug Administration in Rockville, Maryland, for six years.

In this position, he will manage the food safety program for Wyoming, including meat, dairy, restaurant, grocery store, and food processing inspections. He will also manage environmental health activities across the state, including inspections of facilities such as swimming pools, day care centers, and RV parks.

While working with FDA in Washington, D.C., Higgins was responsible for developing and teaching courses in food safety for state and local regulators. In that capacity, he worked closely with WDA Consumer Health Specialists on food safety issues and to generate training on the Hazard Analysis and Critical Control Point (HACCP) program that the WDA officials helped pioneer.

In addition to his federal experience, Higgins also has local government and private industry experience in the Denver area. Prior to his FDA duty, Higgins served nearly three years as the Public Health Investigator for the Denver Department of Health and Hospitals.

Higgins earned his Masters of Science and Bachelors of Science degrees in Environmental Health from Colorado State University in 1978 and 1994, respectively. He received his certification as Registered Environmental Health Specialist from the National Environmental Health Association in 1989. Chuck is also a member of the International Association of Milk, Food and Environmental Sanitarians (IAMFES).

During his tour with the U.S. Public Health Service, he received its second highest award, the Meritorious Service Medal, as well as the Commendation medal, two Achievement medals and a Citation. He also received the Colorado Environmental Health Association Scholarship Award in 1990.

Quality Chekd Dairies, Inc. Names Dietrich to Lead International Expansion

Quality Chekd Dairies, Inc. has named Hans Peter Dietrich to lead the organization's expansion into Europe, the first phase of its planned international expansion. The dairy and ice cream management consulting, licensing, and purchasing organization will offer European dairy and ice cream processors and manufacturers a mirror of the services provided to its 30 members in North America.

A Swiss citizen with global experience in the food industry, Dietrich will head the introduction and implementation of a Quality Chekd program in Europe. A European-based staff for the expansion will ensure that the new venture does not reduce the level of service North American members currently enjoy. His first targets for new business opportunities will include the coordination of technology, information sharing, and marketing, as well as advice on raw and packaging supply, management training, and quality assurance.

Dietrich is a food technologist and international consultant with 32 years of experience in the industry. He has served in management, business development, and food technology positions around the world with Nestlé International, Inc., Mövenpick Gastronomy Corporation, and Hiestand Swiss Gourmet Bakery Co.

Educational Foundation Appoints Michael Zema, FMP, CCE Academic Ambassador

Striving to provide the hospitality industry with the highest quality of service, The Educational Foundation of the National Restaurant Association recently appointed Michael Zema, FMP, CCE, as Academic Ambassador.

Zema will work with academic instructors at two- and four-year colleges and universities in the central region of the United States to establish and conduct educational programs. He will also represent The Educational Foundation at regional and national industry events, including the International Council on Hotel, Restaurant, and Institutional Education (CHRIE) conference and the American Culinary Federation conference. He will also serve on The Foundation's curriculum development advisory committee, which provides insight on development of programs for two- and four-year curriculum, continuing education and international use.

Zema, who also has many years of industry experience, will continue to serve as professor and program coordinator of hospitality management and culinary arts at Elgin Community College in Elgin, IL. Since joining Elgin Community College in 1983, he has taught courses in culinary arts, food facility design, quantity purchasing and menu management. He has also overseen curriculum development including the implementation of The Educational Foundation's Professional Management Development Program (ProMgmt.), a complete foodservice management curriculum for hospitality programs at colleges and universities. Zema also is responsible for enrollment, analysis of new markets and trends, and job placement.

John Marcello, R.S. Receives National Environmental Health Association's 1996 Food Industry Sanitarian Award

John Marcello, R.S., manager of Technical Education for The Educational Foundation of the National Restaurant Association, was recently awarded the 1996 Food Industry Sanitarian Award from the National Environmental Health Association (NEHA).

The Food Industry Sanitarian Award is presented each year by the Food Section and Industry affiliate to a NEHA member in the foodservice industry, in recognition of his or her outstanding contributions to the field of food safety and sanitation.

"This award is a testament to John Marcello's dedication and contribution to the critical issue of food safety, broadening the dialogue among all food safety professionals," said Daniel A. Gescheidle, FMP, president of The Educational Foundation. "Through the course of his career he has become nationally respected for his tireless efforts to establish cooperative initiatives among all food safety professionals, and he exemplifies the qualities needed to advance the industry's level of food safety into the future."

Prior to joining The Educational Foundation in 1992, Marcello was with the DuPage County Health Department in Illinois where he advanced through several positions while earning his Registered Sanitarian credential. While at DuPage, Marcello implemented the Hazard Analysis Critical Control Point (HACCP) food safety system, communication skills for sanitarians, and general staff development into the department's training protocol.

In his current position, Marcello oversees the technical review and regulatory relations for The Foundation's SERVSAFE® Serving Safe Food safety system, helping to establish The Educational Foundation as a leader in food safety training and education; Bar Code®: Serving Alcohol Responsibly program; Aware®: Employee and Customer Safety training; and the Foodservice Security program. Marcello is also part of the management team that administers the Industry Council on Food Safety, a foodservice industry coalition committed to education about safe food preparation and handling.

Marcello also initiated industry/regulatory HACCP workshops, developed and delivered jointly with the FDA's State Training Branch, and established food safety training cooperatives with the United States Department of Agriculture's Cooperative Extension Service. Marcello has also served on several committees of the Conference for Food Protection and is an active member of the International Association of Milk, Food and Environmental Sanitarians (IAMFES).

VICAM Names Dr. Gerald Wogan as Chief Technology Officer

VICAM LP. has named Dr. Gerald N. Wogan as Chief Technology Officer (CTO).

In assuming this newly created position of Chief Technology Officer, Dr. Wogan will be responsible for Research and Product Development functions within VICAM and advise the President and CEO, Jack L. Radlo on matters regarding science and emerging technology. His primary role will be to provide VICAM with a coordinated scientific and technological

direction as VICAM prepares to enter the next millennium. Dr. Wogan will manage an established Research & Development team spearheaded by Dr. Barb Jackson, who will continue to be Director of R & D.

Dr. Wogan has forty years of experience as a professor of applied biological science, environmental health, and food toxicology. He joins VICAM while still maintaining his appointments as Professor of Chemistry and Professor of Toxicology at M.I.T, where he has taught for over thirty-five years. In addition, Dr. Wogan has been elected to membership in the National Academy of Sciences of the U.S. and the Institute of Medicine. He has served as an adviser to the National Institutes of Health, National Center for Toxicological Research, the American Cancer Society, and the U.S. Food and Drug Administration. In his career, Dr. Wogan has served on over 10 editorial boards and has over 350 publications to his credit.

G&H Products Corp. Names Process Systems Specialist

G&H Products Corp. announces that Roger Ashton has accepted the position of Process Systems Specialist responsible for application of all engineered products in process system designs. He will also provide complete technical sales assistance to G&H's District Sales Managers and Distributors on all key projects.

Roger has over 28 years of experience in the sanitary process industry, including design and application of in-place cleaning units. He has held a variety of engineering-related positions at G&H, and most recently was Mixproof Valve Application Manager.

IAMFES to Co-Sponsor Crumbine Award

Beginning in January, the International Association of Milk, Food & Environmental Sanitarians will join with the Conference for Food Protection and several other co-sponsors in sponsoring the Samuel J. Crumbine Consumer Protection Award. The Crumbine Award is given annually to a local U.S. government health unit in recognition of the excellence of its food protection program.

The Conference for Food Protection accepted responsibility for the award when the Foodservice and Packaging Institute, Inc. announced earlier this year that, as part of an association restructuring, it would end its 41-year sponsorship of the award. IAMFES was one of the first organizations to signal its willingness to join with the Conference in assuring the award's continuation. Funds will be contributed by the IAMFES Foundation Fund for 1997.

IAMFES has had a long association with the Crumbine Award. For more than 20 years, the IAMFES President has served on the Crumbine Award jury and a presentation of the award has been made at the IAMFES Annual Meeting.

The other co-sponsors who have pledged to contribute to the award are:

The Association of Food and Drug Officials (AFDO); The Foodservice and Packaging Institute, Inc. (FPI); The Industry Council on Food Safety (Educational Foundation of the NRA); The National Association of County and City Health Officials (NACCHO); The National Environmental Health Association (NEHA); NSF International; Public Health Foundation Enterprises, Inc., and Underwriter's Laboratories Inc.

The award will continue to be presented at three major public health meetings. In addition to the engraved medallions presented to the immediate supervisors of the winning unit at the IAMFES annual



NEWS

meeting, a medallion is also presented to the unit's director of health at the annual NACCHO meeting, and a plaque at the NEHA Annual Educational Conference. The award will continue to be administered by FPI, which initiated the award in 1954 to honor the memory of Dr. Crumbine, a renowned pioneer of public health practice in the early years of this century.

With the addition of the new sponsors, the Crumbine Award Jury has been asked to take up several considerations concerning the conduct of the award, including whether to enlarge the scope of the award to include international entries (of particular interest to IAMFES), and whether to add an AFDO juror and an industry juror to the present panel of seven. Traditionally, the jury has been composed of four regular jurors who, to assure continuity, serve three year terms on a staggered basis, and three association jurors, representing IAMFES, NEHA and NACCHO, who serve one year terms. The jury will decide these issues when it meets next May to judge the 1997 award.

The criteria for the 1997 award are available now for local government health units in the U.S. who wish to prepare entries. An entry consists of a 30-page presentation of a local food program with emphasis on four major aspects of the program:

- Sustained excellence over the preceding 3-5 years, as evidenced by continual improvements in the basic components of a comprehensive program;
- Innovative and effective use of program methods and problem solving to reduce the community's risk from foodborne disease;
- Demonstrated improvements in planning, managing and evaluating a comprehensive program; and
- Successful involvement of people (department managers, staff, industry, the public) in reaching the goals of the food protection program.

To obtain a copy of the detailed award criteria, contact: Crumbine Award, Foodservice & Packaging Institute, Inc., 1901 North Moore Street, Arlington, VA, 22209. Tel: 703-527-7505; Fax: 703-527-7512; e-mail: foodserv@crosslink.net.

Düsseldorf Symposium Emphasizes Role of Codex Dairy Food Standards

An International Symposium entitled, *Influence of Codex Standards on International Trade in Dairy Products* was held September 6-7, 1996 in Düsseldorf, Germany. The Symposium was co-sponsored by the International Dairy Federation (IDF) and the German National Committee of IDF.

The participants of the Symposium included attendees from more than 20 countries. Speakers included representatives of the International Dairy Federation, the World Trade Organization, the Food and Agriculture Organization/World Health Organization, along with dairy industry representatives.

G. A. Henderson, Director, Scientific Relations, Kraft Foods, Inc., U.S.A., delivered one of the keynote speeches and called on participants to recognize that the review and change in status of international health and safety standards could affect virtually every dairy product produced and sold.

Overall, the symposium showed how Codex links to the World Trade Organization (WTO), how Codex works, and its interface with the dairy industry. The symposium dealt with the Codex Committee on Milk and Milk Products, naturally enough, and with the other Codex committees that have an impact on milk products—labelling, food additives and contaminants, hygiene, pesticide residues, residues of veterinary drugs, import and export certification.

A similar IDF Symposium will be held in the United States in November, 1997 in Chicago, Illinois in conjunction with the World Wide Food Expo. More details concerning the Symposium can be obtained by contacting the International Dairy Federation offices, Tel: +32 2 733 16 90, Fax: +32 2 733 04 13, E-mail: fil-idf@mail.interpac.be.

To obtain a copy of the Final Programme and presentations from the Symposium, please contact the International Dairy Federation at any of the numbers noted above.

Caution Urged in Using Warbex

Warbex® is the tradename for the liquid form of the chemical famphur, regulated by FDA as an animal drug, which is designed to be applied topically to treat insect infestations.

The product is approved by the FDA for use on beef cattle, dry cows, and replacement heifers to treat grubs and reduce lice infestation.

There have been reports of death of wild birds due to the deliberate misuse of Warbex®, and even in some cases when the product is used properly. Warbex® is being misused by soaking grain and other items in the liquid famphur. The contaminated grain or other products are then used as bait or as a delivery vehicle to

poison birds, rodents, or predators. This practice introduces famphur into the wildlife food chain. Endangered species, as well as other predatory and scavenging birds, including eagles, hawks, owls, and buzzards, etc., have died as a result of eating these poisoned birds. An undetermined number of bald eagles and red-tailed hawks in Washington State have died after eating starlings that had been intentionally poisoned. Some of this illegal use may be occurring on dairy farms in other states. Birds have also died when Warbex® has been applied to the backs of cattle according to label directions. Some bird species perch on cattle backs and others pull cattle hair, and these birds may receive fatal exposures to famphur.

CVM views the misuse of this product as an unapproved use in violation of the Food, Drug, and Cosmetic Act and implementing regulations. There are discussions underway between the various federal and state agencies involved to decide how best to sanction or control individuals who use the product in this illegal manner. The State of Washington Department of Agriculture has taken the unusual step of requiring registration of the animal drug as a pesticide under state law. A pesticide dealer license is now required for any outlet which distributes Warbex® in Washington.

CVM is working with Mallinckrodt Veterinary, Inc. and the U.S. Fish and Wildlife Service to educate the public about potential hazards to wildlife associated with Warbex® Pour-On 13.2%. Mallinckrodt is planning a public education campaign to try and discourage misuse of Warbex®. Their educational materials will also address the potential environmental problems from use of Warbex® according to the label and how to prevent them. Mallinckrodt will advise product users to promptly dispose of any poisoned

birds in a manner that ensures that the carcasses are not available to other predatory and scavenging birds.

Manufacturer of the Year

Fristams Pumps, Inc. was named Manufacturer of the Year for the 1996 annual Food Industry Suppliers Association (FISA) Conference in Vail, CO. This award is given when members of FISA feel a manufacturer-supplier has made an outstanding contribution to its distributors. That contribution is measured by commitment to distributors, quality of support, competitiveness, and innovation.

Fristams Pumps, Middleton, WI, manufactures sanitary centrifugal and positive displacement pumps for the food, dairy, beverage, pharmaceutical, and biotechnology industries.

Southeast Food Safety Partnership Formed

A consortium of professors and commercial interests has formed a partnership called the Food Safety Institute (FSI) headquartered in New Orleans, LA. Partners include Central Analytical Laboratories, The Russell Marine Group, TechniCAL, Supply-Tech, and Drs. Douglas L. Marshall and Kenneth M. McMillin. FSI provides comprehensive food quality and safety educational programs, training, and support. Programs, consulting, and services are available for GMPs, SOPs, HACCP, regulatory compliance, cleaning & sanitation, certified and accredited product sampling and testing, and thermal process validation. The address for the new company is 250 Plauche Street, New Orleans, LA 70123; phone 504-733-0317; fax 504-733-0345; and e-mail fsi@tcal.com.

Announcement of the 1997 Davis Calvin Wagner Sanitarian Award

The 1997 Davis Calvin Wagner Award is to be presented at the Academy Luncheon during the Annual Educational Conference of the National Environmental Health Association. It consists of a plaque and a \$500.00 honorarium. The Award is open to all Diplomats of the Academy. Criteria for nomination is as follows:

- Exhibits resourcefulness and dedication in promoting the improvement of the public's health through application of environmental health and public health practices.

- Demonstrates professional, administrative, and technical skill and competence in applying such skills to raise the level of environmental health.

- Continues to improve oneself through involvement in continuing education type programs to keep abreast of new developments in environmental health and public health.

- Is of such excellence to merit Academy recognition.

The nominations for the Award may be made by a colleague or a supervisor and must include the following:

- Name, title, grade, and current place of employment of nominee.

- A description of nominee's educational background and professional work experience.

- A narrative statement of how the person meets the criteria for the Award including a description of specific accomplishments and contributions on which nomination is based.

- Three endorsements (an immediate supervisor and two other members of the professional staff or other persons as appropriate).

The deadline for receipt of nominations is April 15, 1997. Three (3) copies of the nomination must be submitted and should be sent to: John G. Todd, Dr., P.H., Chairman, AAS Davis Calvin Wagner Award, 17309 Fletchall Drive, Poolesville, MD 20837.

New Video Explores the Mysterious Case of Groundwater

As concerns about the quality and availability of groundwater affect increasing numbers of citizens, a new video is available to help people understand how to protect this natural resource.

"Groundwater fuels life yet mystery shrouds our understanding of this subterranean water supply," says Kelli Martin, senior research technologist in Penn State's College of Agricultural Sciences. "With contamination on the rise, we need to debunk myths about groundwater and learn how to protect it."

What are these myths? Where does groundwater come from? How is it being contaminated? You can unravel the mystery by watching *The Case of the Mysterious Groundwater*, a 16-minute educational video developed by Penn State's Department of Agricultural and Biological Engineering.

"The video uses animated graphics and creative video techniques to communicate a variety of technical concepts," says Martin, who wrote the video script. "It covers sources of groundwater contamination, the hydrologic cycle, groundwater movement, how aquifers store groundwater, and basic well construction principles."

The first in a series on groundwater protection, the video is aimed at water supply officials, public educators, extension audiences, groundwater protection committees, school children and older students, and municipal planning officials.

Three more groundwater protection videos are set for release in 1997. *Groundwater Protection: Blazing a Healthy Trail* uses an old West motif to explain Pennsylvania aquifers. "This 22-minute video also relates land uses to contamination and describes how to start a community-based groundwater protection group," Martin says.

Groundwater Protection Action Groups: A Roadtrip to Success takes a roadtrip with the fictional Riley family as they learn four ways to make a groundwater protection action group successful.

The final video in the series, *Private Well Construction in Pennsylvania: Setting the Standard*, explores why proper well construction standards are essential to safeguarding private water supplies.

The video series is funded by Penn State's College of Agricultural Sciences and the Department of Agricultural and Biological Engineering. Production services were provided by Shelow-Porterfield Productions.

Copies of *The Case of the Mysterious Groundwater* are available now for \$14.95.

For an order form or more information about groundwater, contact The Department of Agricultural and Biological Engineering, The Pennsylvania State University, 246 Agricultural Engineering Building, University Park, PA 16801; phone (814) 865-7685; FAX (814) 863-1031. People with Internet access can visit the department's site on the World Wide Web: <http://server.age.psu.edu/>.

AffiliateNews

California Affiliate Recognizes a Member

The California Association of Dairy and Milk Sanitarians (CADMS) Sanitarian of the Year Award was established years ago to recognize outstanding people who have distinguished themselves in their field and have contributed significantly and with distinction to the profession of the sanitarian.

At the 1996 Annual Meeting of CADMS, September 25 and 26 in Ontario, CA, the association recognized Howard Eastham as the Sanitarian of the Year.

Howard was a 1959 graduate of California Polytechnic State University, San Luis Obispo, CA where immediately after graduation he served on the faculty teaching the dairy products judging team.

He then went into dairy sales and in 1961 joined the California Department of Agriculture where he remained until his retirement last year. With the Bureau of Milk and Dairy Foods he advanced through various assignments including dairy inspector, district dairy inspector, radiological survey officer – remember the time when we were all concerned about the radioactivity in our milk? – to dairy foods specialist and lastly as milkfat testing coordinator.

In all the roles he held with the branch his dedication to the industry, the people of the industry and the consumer were strongly evident.

Over 25 years our recipient assisted with the University of California-Davis Western Food Industry Conference and, in particular, with the ice cream and milk judging program sponsored by California Dairy Industries Association. He was also a frequent dairy products judge at the Los Angeles County Fair, always willing to lend his taste buds.

He is a long-time member of several industry associations, including California Dairy Industries Association, and the California Association of Dairy and Milk Sanitarians. For CADMS he served as secretary, vice president and president.

CADMS Annual Meeting

One of the invited speakers at the affiliate's annual meeting was IAMFES President Michael Brodsky who spoke on the bacteriological sanitary indices during the main meeting and on "What's Behind the Acronym, IAMFES" at the recognition dinner. The California affiliate appreciates the support of IAMFES in having President Brodsky at their annual meeting.

The affiliate elected their 1997 officers; president is Les Wood, California Dept. of Food and Agriculture; vice president Ed Wensel, Ecolab; 2nd vice president Gary Timmons, California Dept. of Food and Agriculture; and recording secretary Anne Quilter Goldstein, California Dept. of Food and Agriculture. John C. Bruhn, University of California-Davis was

appointed executive secretary and affiliate delegate to IAMFES.

Iowa Assn. of Milk, Food and Environmental Sanitarians' Annual Meeting

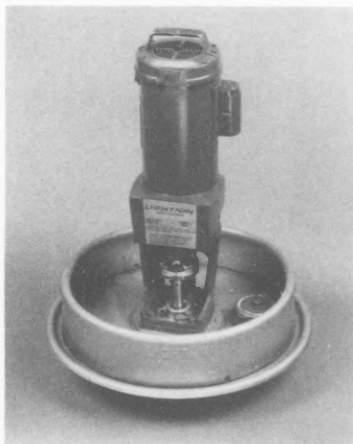
The 55th Annual Meeting of the Iowa Association of Milk, Food and Environmental Sanitarians was held on October 9, 1996 in Waterloo, IA. The meeting included educational sessions, lab sessions, an affiliate business meeting, and an evening banquet.

Eugene Peters was named the recipient of the M. P. Baker Award and new officers were selected: president, Herb Belz; president elect, Norieta Kramer; 1st vice president, Jon Knight; 2nd vice president, Randy Stephenson; and secretary, Monica Striecher.

Wyoming Environmental Health Association Announces Awards

The Wyoming Environmental Health Association is pleased to announce Shirley Etzell as the recipient of the 1996 Outstanding Sanitarian Award. Shirley is Lead Consumer Health Services Specialist.

Howard Hutchings was the recipient of the 1996 Arthur Williamson Award. Howard has now retired as an inspector with the Wyoming Department of Agriculture in Cheyenne.



LIGHTNIN

LIGHTNIN Quik-Connect™ Modular Mixers Twist On for Easy Portable Mixing

LIGHTNIN Quik-Connect™ Modular Mixers simply twist on to intermediate bulk containers (IBCs) for easy, secure mixing during manufacturing, prior to shipment, at customer locations, and at intervals during storage.

Quik-Connect Mixers comply with 1996 U.S. Department of Transportation regulations. New, exclusive fluorocarbon polymer dry-running lip seal reduces fugitive emissions and product contamination. And unlike stuffing box packing, it can be cleaned and reused. Tools are included.

Static EPDM O-rings prevent emissions in the lockdown position. New fluorocarbon polymer bushing is included to reduce shaft runout at seal and to increase shaft stability in the lockdown position.

Quick-release locking pin secures mixer shaft to flange assembly during transport.

The high-torque mixers are available in 1/3, 1 and 3 hp air-driven models and speeds up to 3 1/2 hp in electrical models.

LIGHTNIN, Rochester, NY

Reader Service No. 311

New, Slim Design Miniature Groundwater/ Liquid Level Transmitter

SENSOTEC is pleased to introduce the new Model GWM Liquid Level pressure transmitter featuring a slim .688-inch diameter design which makes it ideal for down-hole applications. Additionally, the GWM is suitable for an array of ground water, waste water, reservoir, undersea, and top accessible tank level applications.

The GWM delivers 0.1% accuracy (BFSL) over gage pressure ranges from 15 to 1000 psi (7 to 70 bar) and the 4-20mA (two wire) output provides a high signal-to-noise ratio necessary for long cable runs. In addition, the 5000 ohm bridge resistance requires low power draw, thus prolonging battery life when used in remote locations. The removable nosecone permits onsite recalibration using a portable pressure calibrator.

The GWM is fitted with a vented, polyurethane jacketed cable terminating in a "T-Chamber" which accepts replaceable desiccant modules to absorb moisture and protect the electronics. A stretch-

resistant stringer in the cable has a 220 lb pull strength and resists breakage caused by the weight of the cable on itself during deep-well applications, insuring retrieval of the unit. The GWM is fully welded and manufactured with 316 stainless steel and Hastelloy-C wetted parts for all-media compatibility. A sacrificial zinc nosecone protects the unit from the effects of galvanic corrosion when used in the presence of electrolytes. A filter is also available for pore water pressure monitoring applications.

Sensotec Inc., Columbus, OH

Reader Service No. 312

Remove Contaminants from Steam In Food Processing

Balston® Steam Filters that permit direct steam contact with food are now available from Whatman, Inc.

Balston Steam Filters remove 98+% of 0.1 micron particles and 100% of all visible particles from steam. Liquid condensate is removed at the same efficiency as for solid particles. Models are available to handle flow rates of up to 3,000 lbs/hr.

Other benefits of Balston Steam Filters include: Reduction in steam condensate mixing with the food products when steam is used for agitating, mixing or cooking; significant reduction in carryover of boiler feedwater chemicals into the food product, causing taste and odor problems; greatly reduced maintenance requirements for

The publishers do not warrant, either expressly or by implication, the factual accuracy of the products or descriptions herein, nor do they so warrant any views or opinions offered by the manufacturer of said articles and products.

valves, cookers, heat exchangers, and other equipment.

Balston Steam Filters are in full compliance with the requirements of the U.S. Food, Drug and Cosmetic Act. They meet the regulations for Indirect Food Additives used as Basic Components for Repeated Use Food Contact Surfaces as specified in 21 CFR Part 177, and Current Good Manufacturing Practices, 21 CFR Part 110. Balston Steam Filters have also been accepted by the USDA for use in federally inspected meat and poultry plants. They are also in full compliance with the 3-A Accepted Practices (Number 609-00) for producing steam or culinary quality, and they are in full compliance with the requirements of the Health Protection Branch of Health and Welfare Canada.

Whatman Inc., Haverhill, MA

Reader Service No. 313

New Purifier® Class I Safety Enclosure Offers Personnel and Environmental Protection from Particulate Contaminants

Labconco Corporation, has introduced the Purifier® Class I Safety Enclosure, designed for applications requiring personnel and environmental protection from particulate contaminants but which require no product protection. Suitable applications include weighing chemical powders, plant pathology work and procedures that generate fine dusts.

The internal blower draws air in, around the technician, through the work area, and then into a 99.99% efficient HEPA filter. The HEPA-filtered exhaust air can be recirculated back into the room, or the cabinet can be connected to an exhaust system and ducted to the outside. All contaminated areas are

under negative pressure so that if a leak should occur, contaminated air is forced through the HEPA filter, not immediately into the room. The two-light filter condition indicator displays differential pressure across the HEPA filter. A green light indicates normal filter condition; an amber light indicates that service is required.

The front sash and side panels are made of scratch-resistant 1/4" thick laminated safety glass. The angled sash tilts up for easy cleaning and loading of the cabinet. A front air foil directs air into the work area providing maximum containment. Fluorescent lighting illuminates the work area. An optional ultraviolet lamp may be used in conjunction with biological applications to maintain surface decontamination while the enclosure is not in use.

The Purifier Class I Safety Enclosure is available in 2- and 3-foot widths and mounts atop an existing bench. Accessories include a work surface and remote exhaust blower.

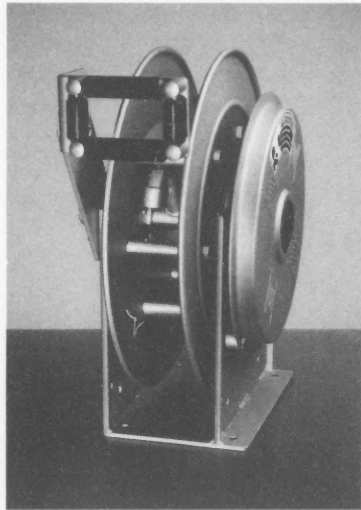
Labconco Corporation, Kansas City, MO

Reader Service No. 314

Hannay Spring Rewind Reel Designed to Carry More Hose, Give More Service

For years, the N700 has been a favorite hose reel in the plant. With its narrow, sturdy frame, the reel can be mounted almost anywhere and is used for air tool operation or handling gases, liquids, chemicals and water.

Now, the N700 has design improvements that meet even more customer requirements and increase its range of applications. These new design features increase the N700's service and efficiency and safety features.



Hannay Reels

A new strong ratchet assembly unit composed of machined, forged and stamped parts is a complete and separate unit. This affords better access to the pawl and pin and is especially helpful when using the N700 on cranes and other hard-to-reach machinery.

An improved spring motor incorporates new seals and redesigned arbor for better service in dirty environments, eliminating water and dirt getting into the spring case.

The outlet riser position is positioned below the drum surface to give better alignment on the drum for initial retraction.

Hannay Reels, Westerlo, NY

Reader Service No. 315

Drew Industrial Division of Ashland Chemical Company Announces ONGUARD® FR Series Control System

Ashland Chemical Company's Drew Industrial Division has announced the availability of the ONGUARD FR series control system. The control system is the

result of a strategic supplier alliance between the Drew Industrial Division and the Fisher-Rosemount Service and Support Division. The agreement extends Drew Industrial's ability to supply its customers with quality instrumentation and control systems manufactured and serviced worldwide by Fisher-Rosemount.

The ONGUARD FR series controller system offers improved process control in water treatment applications because of its modularity in hardware, firmware, and software design as well as its ability to connect to many types of communicating devices. The ONGUARD FR series controllers also have the capability of efficiently implementing simple or complex measurement and control strategies. In addition, the system is monitored via telephone where operating data is automatically archived and system upsets and alarms communicated.

Ashland Chemical, Boonton, NJ

Reader Service No. 316

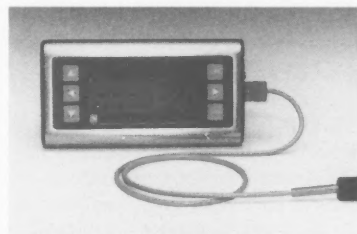
Two-Hour Laboratory Test for *E. coli* Toxins Now Available

Premier EHEC is a microwell EIA for the detection of the toxins produced by Enterohemorrhagic *E. coli* in culture systems. This product detects all EHEC serotypes, unlike currently available methods which are limited to *E. coli* O157:H7 detection. The 96-determination breakaway well format provides flexibility to laboratories of all sizes. The product has a simple, easy to use procedure and contains color-coded ready to use reagents. The assay takes just over two hours to perform and results can be read visually or spectrophotometrically with a standard microplate reader.

Current methods for detecting toxins take 24-48 hours to return results. *E. coli* O157:H7 is the most common serotype in the United States. However, this is just one of over 50 *E. coli* strains including O111 which produce toxins and lead to potentially severe complications especially in children. Current methods, such as Sorbitol-MacConkey agar and latex agglutination, are limited to the detection of the O157:H7 strain and cannot determine toxin production. Premier EHEC detects all toxin-producing EHEC strains.

Meridian Diagnostics, Inc., Cincinnati, OH

Reader Service No. 317



Nth Degree

Introducing the PSR Programmable Sample Recorder for Quality Assurance and HACCP Documentation Needs

Nth Degree Inc. is offering the PSR Programmable Sample Recorder. This unique device is a user-defined, programmable temperature recorder that gives you a snapshot of date, time, temperature and designated processing function for your specific list of products. By simply pressing a button, you can record critical temperatures for all your quality assurance and HACCP documentation needs. Unique to the PSR is the ability to load the actual name of the product into the memory instead of assigning a number or touch point. You can load as many

as 150 product names into memory using the PSRsoft Uploading and Downloading Software. The large LCD makes it easy for you to see the name of the product, temperature, date, time, process and sample number. By just pressing a button, the PSR stores the data sample, with the capacity to store up to 1,000 samples. All of the stored samples can be downloaded to your computer at the end of a shift, or on a daily or even weekly basis. The PSR is simple to use, battery operated, yet compact and rugged.

Nth Degree, Inc., San Luis Obispo, CA

Reader Service No. 318

Inexpensive Temperature Logger with Rigid External Probe and Field Data Shuttle

Onset Computer Corporation introduces a rugged, weather-proof logger with a six inch stainless steel probe for pinpoint temperature recording. Offload stored data by connecting the logger to a PC or Mac; or use the unique pocket-sized Optic Shuttle™ to read out and relaunch up to sixteen loggers in the field.

The miniature StowAway™ TidbiT™ XT logger measures temperature from -20°C to +70°C (-4°F to +158°F) and comes with a seven year factory-replaceable battery. The logger records up to 7,944 measurements on nonvolatile EEPROM memory and is reusable. The temperature sensor is located at the tip of a six inch stainless steel probe on a durable six foot water-proof cable. Use point-and-click LogBook® software for Windows or Mac to start the loggers, read out collected data, and view a time-stamped temperature graph. Data is easily transferred to popular spreadsheet programs.

The revolutionary Optic Shuttle™ is an inexpensive hand held data transporter which is used to read out and restart up to sixteen StowAway™ TidbiT™ XT temperature loggers on location. The Optic Shuttle™ is weatherproof, allowing data transfer in the roughest conditions. Temperature data is stored in 128K of memory and is easily transferred to a PC or Mac for analysis using LogBook® software.

The StowAway TidbiT™ XT temperature logger and the Optic Shuttle™ are U.S. \$199.00 each. The Starter Kit includes LogBook® software, interface cable, TidbiT™ Coupler and an Optic Base Station™ for connecting to a PC or Mac for U.S. \$129.00.

Onset Computer Corporation, Pocasset, MA

Reader Service No. 319

Listeria Testing: Rapid Results with Culture Confirmation

Dynabeads® anti-Listeria is designed for rapid, immunomagnetic selective enrichment (IMS) of *Listeria* directly from pre-enrichment broths. The rapid and simple protocol (less than 30 minutes) saves 24 hours of valuable testing time compared to standard culture methods because Dynabeads® anti-Listeria simply replaces the use of Fraser selective enrichment broths. Isolated *Listeria*

colonies (or negative results) are achieved in 48 hours from receipt of sample.

Dynabeads® anti-Listeria are uniform, superparamagnetic microspheres (2.8 microns in diameter) with affinity purified antibodies on their surface. When incubated with a sample, Dynabeads® will bind their target bacterium forming a bacterium:magnetic bead complex. This complex is separated from the heterogeneous sample by performing the test in a magnetic test tube rack (DynaL MPC®-M). The isolated and concentrated bacterium:bead complex can then be cultured on any selective culture medium (e.g., Oxford, Palcam).

Dynabeads® IMS method is a rapid culture technique. Colony acquisition means rapid results with culture confirmation. This highly sensitive system will detect as few as 100 organisms/ml of pre-enriched sample. Complete detection is achieved for the genus *Listeria*. The concentration and purification of the sample by immunomagnetic separation (IMS) improves bacterial isolation and thus is useful for cultural confirmation of other presumptive methods. The protocol is simple and reagents are shelf stable. The versatility provided by this methodology will allow testing of many different sample types while enhancing the efficiency of existing manual and automated detection methods.

Dynal, Lake Success, NY

Reader Service No. 320

Precast Mini-Polyacrylamide Gels Available in a Variety of Sizes, Concentrations, and Package Quantities

A wide selection of precast polyacrylamide gels for use in mini electrophoresis units is now available from Sigma Chemical Company. Offered in convenient single packs as well as multi-gel packages, Sigma Precast Mini-Polyacrylamide Gels provide fast, easy, and safe use while ensuring highly uniform and reproducible separations. Both 8 × 10 cm and 10 × 10 cm formats are available.

Sigma Mini-Polyacrylamide Precast Gels are available with Tris-HCl and Tris-Tricine buffer systems as well as gels for isoelectric focusing. Gels with the Tris-HCl buffer system are suitable for separating proteins and nucleic acids and can be ordered in concentrations of 5, 7.5, 10, 12.5 and 15% or gradient concentration ranges of 2 to 15, 4 to 20, and 10 to 27%. Gels with the Tris-Tricine buffer system are recommended for separating low molecular weight proteins and peptides and are available in a 10 to 20% concentration. Polyacrylamide gels for isoelectric focusing have an IEF pH range of 3 to 10.

Sigma Chemical Company, St. Louis, MO

Reader Service No. 321

BusinessExchange

Employment Opportunities

ASSOCIATE PROFESSOR FOOD SAFETY MICROBIOLOGY

The Department of Food Science and Technology, University of California, Davis - teaching food microbiology; advising; directing graduate students (M.S. and Ph.D.); working with campus food microbiologists and other scientists on program development; and developing a research program in microbial food safety. The specific research program will depend on the expertise and interests of the candidate. Requires Ph.D. in microbiology or related field and development of and interest in maintaining a research program in food safety microbiology. The position is 45% teaching, 55% research. It is a nine-month tenure-track appointment; eleven-month term employment to be offered and continued based on academic personnel review. Send statement of research and teaching interests, curriculum vitae, lists of publications and research support, and names, addresses and telephone numbers of at least four professional references to: David Ogrydziak, Search Committee Chair, Department of Food Science and Technology, University of California, Davis, CA 95616-8598, Tel: 916-752-8079; Fax: 916-752-4759. Position open until filled. To assure consideration, applications should be received by January 31, 1997. The position is available beginning July 1, 1997. The University of California is an Affirmative Action, Equal Opportunity Employer

Services/Products



Michelson Laboratories, Inc.

6280 Chalet Drive, Los Angeles, CA 90040
Telephone: (310) 928-0553 / (714) 971-0673 / FAX (310) 927-6625

COMPLETE ANALYSIS SPECIALIZING IN:

- Chemical
- Microbiological
- Sugar Profile
- Fatty Acid Profile
- Vitamin A & D
- Quality Assurance
- Consulting
- IMS-USPHS-FDA
- Antibiotic Analysis
- Approved 06143

MEMBER
ACIL

TECHNIQUES AVAILABLE:

- Infrared Milk Analysis
- Mass Spectrometry
- Gas Chromatography
- Atomic Absorption
- Spectrophotometry
- Spectrofluorometry
- Microscopy
- Inductively Coupled Plasma
- Optical & Direct Microscopic Cell Count
- ELISA Methodology

Also Offering: Milk calibration Samples for Infra-red Milk Analyzer and Electronic Somatic Cell Counter

Reader Service No. 163



Model III ss x

*U.S. Pat. No. 4,380,166

The CDT™ Test Device*
For testing all differential
controls on H.T.S.T. pasteurizers
Model III ss x now shipping!
New adapters** connect directly to
HTST's sanitary pressure sensors



The Crombie Company
521 Cowles Ave., Joliet, IL 60435-6043
815-726-1683 (Voice & FAX)

**Adapters may be ordered separately - fit all previous models.

Reader Service No. 124

ADVERTISE

YOUR PRODUCT OR
SERVICE HERE!

For rates or information,
contact:

Rick McAtee, Advertising Mgr.

1-800-369-6337
or 515-276-3344

COMPLETE LABORATORY SERVICES

Ingman Labs, Inc.
2945 - 34th Avenue South
Minneapolis, MN 55405
612-724-0121

Reader Service No. 153

Reward Industry Excellence

Nominate Now!

**The 1997
IAMFES
Black Pearl Award**

Nominate a company superior in food quality
and safety for the Black Pearl Award
presented annually at the
IAMFES Annual Meeting.

The Black Pearl Award, sponsored by Wilbur Feagan and F&H Food Equipment Company, was first presented in 1994. The Black Pearl Award was established to recognize a company for its outstanding commitment to and achievement in corporate excellence in food safety and quality. For more information and to receive nomination criteria and forms, contact the IAMFES office at 1-800-369-6337.



WHAT IS 3-A SYMBOL COUNCIL?

by Earl O. Wright

Members of the 3-A Symbol Council do not participate in preparing 3-A Sanitary Standards or 3-A Accepted Practices. Their function is to authorize and administer the use of the registered 3-A Symbol.

The 3-A Symbol Council consists of an 8-member Board of Trustees having the following representation:

- 4 - Trustees designated by IAMFES
- 2 - Trustees designated by DIC
- 2 - Trustees designated by DFISA

The objectives and purposes of the Council, through voluntary action are as follows:

- Promote public health.
- Minimize confusion and conflict in the field of Standards relating to sanitary performance of dairy equipment.

- Encourage use of dairy equipment of sanitary design by administering and supervising proper use of the 3-A Symbol emblematic of compliance with standards of sanitary design as promulgated and developed by the 3-A Sanitary Standards Committees.

In addition to use of the Symbol being voluntary, its certification as meeting all parameters of the respective 3-A Sanitary Standard is the responsibility of the equipment manufacturer. It is a voluntary certification and compliance program. The non-profit council defrays administrative expenses by fees set for authorization to use the 3-A Symbol.

Rescinding Amendments to 3-A Sanitary Standards for Instrument Sensors and Sensor Fittings and Connections Used on Milk and Milk Products, Number 09-09

Formulated By
International Association of Milk, Food and Environmental Sanitarians
United States Public Health Service
The Dairy Industry Committee

In accordance with the action of the 3-A Sanitary Standards Committees as recorded in the minutes for May 24, 1996, the 3-A Sanitary Standards for Instrument Sensors and Sensor Fittings and Connections Used on Milk and Milk Products, Number 09-09, dated August 20, 1994 are hereby rescinded. **Subsequent to the effective date, the 3-A Sanitary Standards for Instrument Sensors and Sensor Fittings and Connections Used on Milk and Milk Products, Number 09-09, dated August 20, 1994 will become null and void.**

This amendment to 3-A Sanitary Standards for Instrument Sensors and Sensor Fittings and Connections Used on Milk and Milk Products, Number 09-09 is effective November 24, 1996.

Rescinding Amendments to 3-A Sanitary Standards for Liquid Pressure and Level Sensing Devices, Number 37-01

Formulated By
International Association of Milk, Food and Environmental Sanitarians
United States Public Health Service
The Dairy Industry Committee

In accordance with the action of the 3-A Sanitary Standards Committees as recorded in the minutes for May 24, 1996, the 3-A Sanitary Standards for Liquid Pressure and Level Sensing Devices, Number 37-01, dated August 20, 1994 are hereby rescinded. **Subsequent to the effective date, the 3-A Sanitary Standards for Liquid Pressure and Level Sensing Devices, Number 37-01, dated August 20, 1994 will become null and void.**

This amendment to 3-A Sanitary Standards for Liquid Pressure and Level Sensing Devices, Number 37-01 is effective November 24, 1996.

3-A Sanitary Standards for Ball-Type Valves for Milk and Milk Products, Number 68-00

Formulated By
International Association of Milk, Food and Environmental Sanitarians
United States Public Health Service
The Dairy Industry Committee

It is the purpose of the IAMFES, USPHS, and DIC in connection with the development of the 3-A Sanitary Standards Program to allow and encourage full freedom for inventive genius or new developments. Ball-type valve 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 IAMFES, USPHS, and DIC at any time. **NOTE:** Use current revisions or editions of all referenced documents cited herein.

A SCOPE

- A1 These standards cover the sanitary aspects of ball-type valves used on processing equipment and on equipment and lines which hold or convey milk or milk products.
- A2 In order to conform with these 3-A Sanitary Standards, ball-type valves shall comply with the following design, material, and fabrication criteria.

B DEFINITIONS

- B1 *Products:* Shall mean milk and milk products.
- B2 **Equipment Components**
- B2.1 *Ball-type Valves:* Shall mean valves which use a ball with a single or multiple passages to direct or stop flow. The ball is coupled to a shaft to turn the ball.
- B2.2 *Body Cavity Fillers (Encapsulating Seals):* Shall mean seals which fill the voids between the ball and body.
- B3 **Surfaces**
- B3.1 *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.
- B3.2 *Nonproduct Contact Surfaces:* Shall mean all other exposed surfaces.

B4 Cleaning

- B4.1 *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.
- B5 *Close Coupled:* Shall mean mating surfaces or other juxtaposed surfaces that are less than twice the nominal diameter or cross section of the mating surfaces or a maximum of 5 in. (127 mm).
- B6 *Readily or Easily Removable:* Shall mean quickly separated from the equipment with the use of simple hand tools if necessary.
- B7 *Simple Hand Tools:* Shall mean implements normally used by operating and cleaning personnel such as a screwdriver, wrench, or hammer.

C MATERIALS

- C1 **Metals**
- C1.1 Product contact surfaces shall be of stainless steel of the American Iron and Steel Institute (AISI) 300 Series' or corresponding Alloy Cast

Institute (ACI) types² (See Appendix, Section G), 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, O-rings, seals, body cavity fillers, 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 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.

C2.2 Plastic materials may be used for gaskets, body cavity fillers, seals, O-rings, and parts having the same functional purposes.

C2.2.1 Plastic materials when used for the above specified application(s) shall conform 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 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 and bactericidal treatment or sterilization.

C3 Sterilization

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 ball valves 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.

C4 Nonproduct Contact Surfaces

C4.1 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 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. 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.

D3 Cleaning and Inspectibility

D3.1 Product contact surfaces shall be easily accessible for inspection and manual cleaning only. Removable parts shall be readily demountable.

D4 Draining

D4.1 All product contact surfaces of the valve shall be self-draining, except for normal clingage, when the valve is properly installed and the valve ball is properly positioned.

D4.2 There shall be no voids between the ball and the valve body.

D5 Fittings

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

D6 Gaskets

D6.1 Gaskets having a product contact surface shall be removable.

D6.2 Grooves in gaskets shall be no deeper than their width.

D6.3 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. (6.35 mm) wide except those for standard O-rings smaller than 1/4 in. (6.35 mm), and those provided for in Section D5.1.

D7 Radii

D7.1 All internal angles of less than 135° on product contact surfaces shall have radii of not less than 1/8 in. (3.18 mm) except that:

D7.1.1 The radii in grooves in gaskets or gasket retaining grooves, except for those provided for in Section D5, and those for standard 1/4 in. (6.35 mm) and smaller O-rings, shall be not less than 1/16 in. (1.59 mm).

D7.1.2 The radii in grooves for standard 1/4 in. (6.35 mm) O-rings shall not be less than 3/32 in. (2.38 mm) and for standard 1/8 in. (3.18 mm) O-rings shall be not less than 1/32 in. (0.794 mm).

D8 Threads

D8.1 There shall be no threads in contact with the product.

D9 Outlet Valves

D9.1 Outlet valves shall be close coupled to minimize the distance between the mounting face and shutoff point.

D10 Sterilization

D10.1 Ball-type valves 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:

D10.1.1 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) operate at the temperature required for processing.

D10.1.2 Ball-type valves 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 resterilized, shall have a steam or other sterilizing medium chamber surrounding all nonpermanent joints and seals. The ball valves shall be constructed so that the steam chamber or other sterilizing medium chamber may be exposed for inspection.

D10.1.3 Where steam or other sterilizing medium is used, the connection(s) on the ball-type valves shall be such that the steam lines or other sterilizing medium lines can be securely fastened to the ball-type valves. The ball-type valves shall be constructed so that the steam or other sterilizing medium chamber may be exposed for inspection.

D11 Powered Valve Actuators

D11.1 Valves with powered actuators shall have an open space of at least 1 in. (25.4 mm), clear for inspection, between the actuator and the valve.

D10.2 Powered actuators shall be readily demountable from the valve and stem.

D12 Nonproduct Contact Surfaces

D12.1 Nonproduct contact surfaces shall be smooth, free of pockets and crevices, and be readily cleanable. Those to be coated shall be effectively prepared for coating.

APPENDIX

E STAINLESS STEEL MATERIALS

Stainless steel conforming to the applicable composition ranges established by ANSI 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 specifications³ A351/A351M, A743/A743M and A744/A744M.

F PRODUCT CONTACT SURFACE FINISH

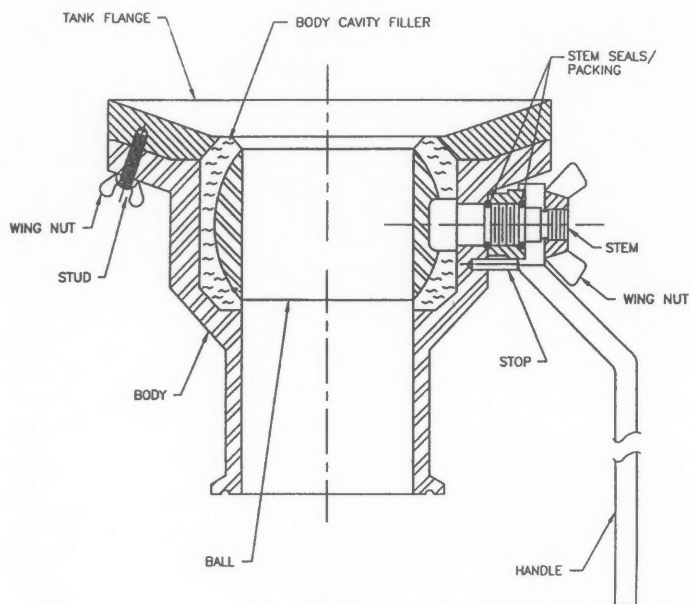
Surface finish equivalent to 150 grit or better as obtained with silicon carbide, properly applied on stainless steel sheets, is considered in compliance with the requirements of Section D1 herein. A maximum R_a of 32 μ in. (0.80 μ m), when measured according to the recommendations in American National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

G DIAGRAMS

These diagrams are intended to demonstrate general principles only, and are not intended to limit individual ingenuity. The design used should conform with the sanitary requirements set forth in these 3-A Sanitary Standards. The following examples are included in this Appendix:

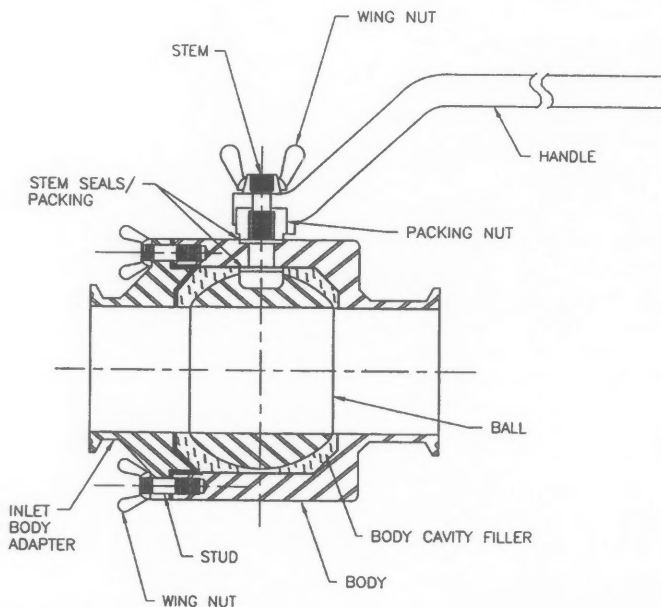
DRAWING NAME	3-A DRAWING NO.	PAGE
Sanitary Flush Bottom Ball Valve	3-A 68-00-01	5
Sanitary 2-Way Ball Valve	3-A 68-00-02	6
Sanitary 2-Way Ball Valve With Actuator	3-A 68-00-03	7
Sanitary 3-Way Ball Valve	3-A 68-00-04	8

3-A 68-00-01



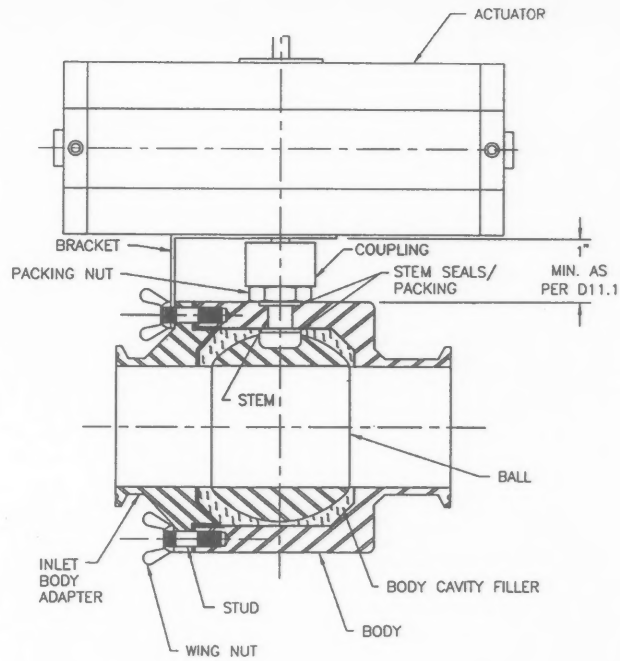
SANITARY FLUSH BOTTOM BALL VALVE

3-A 68-00-02



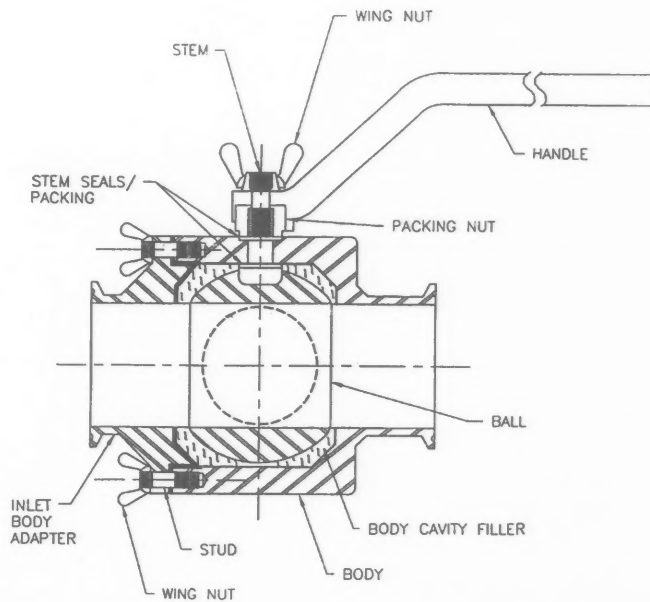
SANITARY 2-WAY BALL VALVE

3-A 68-00-03



SANITARY 2-WAY BALL VALVE
WITH ACTUATOR

3-A 68-00-03



SANITARY 3-WAY BALL VALVE

¹The data for this series are contained in the *AISI Steel Products Manual, Stainless & Heat Resisting Steels*, November 1990, Table 2-1, pp. 17-20. Available from the American Iron and Steel Society, 410 Commonwealth Drive, Warrendale, PA 15086 (412) 776-1535.

²Steel Founders Society of America, Cast Metal Federation Building, 455 State Street, Des Plaines, IL 60016 (708) 299-9160.

³Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 (610) 832-9500.

⁴Available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017-2392 (212) 705-7722.

These standards are effective November 23, 1996.

3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Number 20-18

Formulated By
International Association of Milk, Food and Environmental Sanitarians
United States Public Health Service
The Dairy Industry Committee

EDITOR'S NOTE:

H6 was omitted from the original 3-A Standard which ran in the October issue of *Dairy, Food and Environmental Sanitation* on page 685.

H6 Data values beyond the permitted maximum weight loss or weight gain limits may be challenged as outlying observations as described in ASTM 178. Physical reasons may be known or discovered which could reject a data value. Procedures or calibrations of equipment, for example, may be causes. Statistical tests may be used to determine if the values are outlying observations. Documented outlying observations may be rejected.

3-A Accepted Practices for the Design, Fabrication, and Installation of Milking and Milk Handling Equipment, Number 606-04

Formulated By
International Association of Milk, Food and Environmental Sanitarians
United States Public Health Service
The Dairy Industry Committee

It is the purpose of the IAMFES, USPHS, and DIC in connection with the development of the 3-A Sanitary Standards Program to allow and encourage full freedom for inventive genius or new developments. Milking and milk handling equipment 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 IAMFES, USPHS, and DIC at any time.

NOTE: Use current revisions or editions of all referenced documents cited herein.

A SCOPE

- A1 These 3-A Accepted Practices shall pertain to equipment used in a milking system that begins with the equipment applied to the cow to extract milk and continues to all components in the system exclusive of the container in which the raw milk is stored or from which the milk is removed from the dairy farm.
- A2 In order to conform with these 3-A Accepted Practices, milking and milk handling equipment shall comply with the following design, material, fabrication, and installation criteria.

B DEFINITIONS (See Appendix, Section J, Figures 1 & 2)

- B1 *Product:* Shall mean raw milk.
- B2 *Solutions:* Shall mean those homogeneous mixtures of chemical solute(s) and solvent used for flushing, cleaning, rinsing, and sanitizing.
- B3 **Surfaces**
- B3.1 *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.
- B3.2 *Solution Contact Surfaces:* Shall mean the interior surfaces of the equipment or system

which are used exclusively for supply and recirculation of cleaning and/or sanitizing solutions, except those used to supply concentrated cleaning and/or sanitizing materials to the point of use.

- B3.3 *Nonproduct Contact Surfaces:* Shall mean all other exposed surfaces.
- B3.3.1 *Splash Contact Surfaces:* Shall mean other nonproduct contact surfaces that during normal use are subject to accumulation of soil and which require routine cleaning.

B4 Cleaning

- B4.1 *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.
- B4.1.1 *Cleaned In Place (CIP):* Shall mean mechanical cleaning of equipment, the cleanability of which has been sufficiently established such that all product or solution contact surfaces do not have to be readily accessible for inspection, i.e. silo-type tanks or welded pipelines.
- B4.2 *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.

B5 Pipelines

- B5.1 *Milk Line*: Shall mean rigid pipelines which have welded joints or sanitary fittings and are designed for mechanical cleaning and which are used for the dual function of transporting milk and air.
- B5.2 *Wash Line*: Shall mean rigid pipelines which have welded joints or have sanitary fittings and are used exclusively for the supply and recirculation of cleaning and/or sanitizing solutions, except those used to supply concentrated cleaning and/or sanitizing materials to the point of use.
- B5.3 *Main Air Line*: Shall mean the rigid pipe or tube from the vacuum pump through the sanitary trap to the receiver.
- B5.4 *Milk Transfer Line*: Shall mean a pipe which performs the single function of transporting milk.
- B5.5 *Pulsator Air Line*: Shall mean the rigid pipe or tube that supplies vacuum to the pulsator(s).

B6 Component Equipment

- B6.1 *Sanitary Fittings*: Shall mean welded or rolled-on fittings with gaskets to form joints designed for mechanical cleaning which form substantially smooth flush interior surfaces.
- B6.2 *Air Injector*: Shall mean a mechanical valve used to admit air intermittently into the washing system to increase the cleaning action.
- B6.3 *Short Pulse Tube*: Shall mean the flexible air hose or tube between the claw or unit mounted pulsator and the teatcup shell.
- B6.4 *Claw*: Shall mean the sanitary manifold (which may include a reservoir or claw bowl) that spaces the teatcup assemblies in a cluster and connects them to the long milk tube and may include a manifold to connect the long pulse tube to the short pulse tubes.
- B6.5 *Cluster*: Shall mean an assembly comprising teatcups and claw.
- B6.6 *Teatcup Jettors*: Shall mean the manifold assembly used to supply cleaning solutions through the claw and teatcup assemblies for mechanical cleaning in the milking parlor.
- B6.7 *Vacuum Tube*: Shall mean a flexible air tube or hose that connects a bucket milker to a vacuum line.
- B6.8 *Long Pulse Tube*: Shall mean a flexible air tube or hose that connects a pulsator to a claw.
- B6.9 *Milk Meter*: Shall mean in-line equipment that measures the quantity or rate of flow of milk from individual cows.
- B6.10 *Long Milk Tube (Milk Hose)*: Shall mean a flexible hose or tube that connects the claw or claw bowl to a bucket or a milk line or a milk transfer line.
- B6.11 *Milk Inlet*: Shall mean a nipple on the milk line or milk transfer line.
- B6.12 *Milk Cock (Milk Inlet Valve)*: Shall mean an open-close device incorporated in the milk inlet.
- B6.13 *Short Milk Tube*: Shall mean a tube that connects the teatcup liner to the claw inlet nipple.
- B6.14 *Nipple*: Shall mean a short pipe projecting from the claw, pulsator, milking machine lid, or other part of the milking system apparatus.
- B6.15 *Pipeline Milking Machine*: Shall mean a milking equipment system utilizing milk lines and/or milk transfer lines.
- B6.16 *Receiver*: Shall mean a vessel that receives milk from the milk line or milk transfer line.
- B6.17 *Releaser*: Shall mean a device that releases milk from under vacuum and discharges it to atmospheric pressure.
- B6.18 *Sanitary Trap*: Shall mean a flow vessel that separates the milk side of a milking machine system from the vacuum supply side to keep milk and fluids out of the vacuum system and to prevent back-flow of fluids.
- B6.19 *Slip-On Connectors*: Shall mean a nipple free of barbs over which a hose is positioned without any additional attachment.
- B6.20 *Stall Cock*: Shall mean the valve device on the pulsator air line to which the vacuum hose or pulsator is attached.
- B6.21 *Teatcup*: Shall mean the teatcup shell and liner or inflation.
- B6.22 *Teatcup liner or Inflation*: Shall mean a rubber or rubber-like flexible sleeve with mouthpiece and barrel which fits inside the teatcup shell. The liner may have an integral or separate short milk tube.
- B6.23 *Teatcup Shell*: Shall mean the metal or plastic case or shell in which the teatcup liner or inflation is enclosed.
- B6.24 *Transfer Station*: Shall mean a receptacle and piping or tubing system which conveys milk from the milking area to the container in which the milk is stored. Transfer stations are used with the pail or bucket type milking units.
- B6.25 *Vacuum Pump*: Shall mean an air pump(s) connected to a milking system that creates a suction and maintains partial vacuum.

- B6.26 *Bucket Milking Machine*: Shall mean a machine in which milk flows from the claw into a portable milk receiving bucket which is connected to the vacuum system.
- B6.27 *Distribution Tank*: Shall mean an air vessel or chamber, in the main air line between the vacuum pump and the sanitary trap, which acts as a manifold for other pipelines.
- B6.28 *Drop Lines for Mechanical Cleaning*: Shall mean those flexible hoses which connect wash lines to teatcup jettors or milk meters.
- B6.29 *Milk Cooling and Holding Tank*: Shall mean a vertical or horizontal cylindrical, rectangular, or oval or other equally satisfactorily shaped tank.
- B6.30 *Milking Parlor*: Shall mean a milking area where cows are present only when being milked.
- B6.31 *Milk Pump*: Shall mean a centrifugal or positive displacement pump which moves milk from the receiver to the milk holding tank.
- B6.32 *Pulsator*: Shall mean a device for producing cyclic pressure change inside a teatcup shell.
- B6.33 *Vacuum Milk Holding Tank*: Shall mean a milk cooling and holding tank which is under vacuum during milking.
- B7 *Simple Hand Tools*: Shall mean implements normally used by operating and cleaning personnel such as a screwdriver, wrench or hammer.

C MATERIALS

C1 Metals

The materials of product contact surfaces of equipment included in the milking system for which there are 3-A Sanitary Standards or 3-A Accepted Practices shall comply with the material criteria of the applicable standards or accepted practices.

- C1.1 Other product contact surfaces shall be of stainless steel of the American Iron and Steel Institute (AISI) 300 Series¹ or corresponding Alloy Cast Institute (ACI) types² (See Appendix, Section H), 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:
- C2 Nonmetals
- C2.1 Glass may be used for milk lines, milk transfer lines, receivers, receiver air lines, claws, fittings, and elbows, and shall be of a clear, heat-resistant type.
- C2.2 Rubber and rubber-like materials may be used in sealing applications, long air hoses, milk hoses, short milk tubes, vacuum tubes, long and short pulse tubes, filter parts, teatcup liners, teatcup

jettors, O-rings, drip deflectors, level sensing devices (probes), sensor insulators, and parts having the same functional purposes.

- C2.2.1 Rubber and rubber-like materials, when used for the above specified application(s), shall conform 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.
- C2.3 Plastic materials may be used in sealing applications, transparent flexible tubing for transfer stations, milk hoses, short milk tubes, milk line fittings, vacuum tubes, long and short pulse tubes, plug-type valves, sight and light openings in product or solution pipelines, milk lines or wash lines, filter parts, teatcup liners, O-rings, drip deflectors, level sensing devices (probes), sensor insulators, teatcup jettors, metering devices, releasers, claws, pipeline drain assemblies, air injectors, buckets and bucket lids, float balls and milk inlets and parts having the same functional purposes.
- C2.3.1 Plastic materials when used for the above specified application(s) shall conform 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.
- C2.4 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.
- C2.5 The final bond and residual adhesive, if used, on bonded rubber and rubber-like materials and bonded plastic materials shall be nontoxic.³
- C2.6 Where materials having certain inherent functional purposes are required for specific applications, such as probe coatings and rotary seals, carbon and/or ceramic materials may be used. Carbon and/or 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.
- C3 Solution contact surfaces shall be of stainless steel of the American Iron and Steel Institute (AISI) 300 Series or corresponding Alloy Cast Institute (ACI) types (See Appendix, Section H), 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, or of clear heat resistant glass

pipng. Rubber and rubber-like materials or plastic materials complying with C2.2.1 or C2.3.1 may be used for sealing applications and for short flexible takedown jumpers or slip-on connectors.

C4 Nonproduct Contact Surfaces

C4.1 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.

C5 Main air lines and/or pulsator air lines shall be made of materials which will withstand periodic cleaning. If these lines are used as part of the product contact surface cleaning circuit, they must comply with Section C3.

C6 Paper gaskets shall not be used.

D FABRICATION

D1 The fabrication criteria of equipment included in the milking system for which there are 3-A Sanitary Standards or 3-A Accepted Practices shall be those of the applicable standards or accepted practices. (See Appendix, Section T.)

D2 Other equipment shall conform to the following fabrication criteria.

D2.1 Surface Texture

D2.1.1 All product and solution 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 I), except that:

D2.1.1.1 The solution contact surfaces for castings for pumps shall be at least as smooth as ACI Surface Indicator Scale SIS-1. (See Appendix, Section K.)

D2.2 All permanent joints in metallic product contact surfaces shall be continuously welded except that rolled-on fittings may be used as provided for in 3-A Sanitary Standards for Sanitary Fittings for Milk and Milk Products, Number 63.

D2.3 Gaskets

D2.3.1 Gaskets having a product or solution contact surface shall be removable or bonded.

D2.3.2 Grooves in gaskets shall be no deeper than their width unless the gasket is readily removable and reversible for cleaning.

D2.3.3 Gasket grooves or 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 D2.9.

D2.4 Radii

D2.4.1 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:

D2.4.1.1 Smaller radii may be used when they are required for essential functional reasons, such as those in O-ring grooves, claw assemblies, and milking machine lids. In no case shall such radii be less than 1/32 in. (0.794 mm).

D2.4.1.2 The radii in gasket grooves, gasket retaining grooves, or grooves in gaskets, and those provided for in Section D2.9 and except for those for standard 1/4 in. (6.35 mm) and smaller O-rings, shall be not less than 1/8 in. (3.18 mm).

D2.4.1.3 The radii in grooves for standard 1/4 in. (6.35 mm) O-rings shall not be less than 3/32 in. (2.38 mm) and for standard 1/8 in. (3.18 mm) O-rings shall be not less than 1/32 in. (0.794 mm).

D2.4.2 The minimum radii for fillets of welds in product contact surfaces shall be not less than 1/4 in. (6.35 mm) except that the minimum radii for such welds may be 1/8 in. (3.18 mm) when the thickness of one or both parts joined is less than 3/16 in. (4.76 mm).

D2.5 Openings in Covers

D2.5.1 All milk lines and/or milk transfer lines and other appurtenances entering through the lid or cover of the cooling and/or holding tank, and not permanently attached to the cover, shall be fitted with a sanitary drip deflector that overlaps the edges of the opening through the cover and is located as close as possible to the cover.

D2.6 Drainage

D2.6.1 The bottom of all product containers (surge tanks, distribution tanks, and receivers) which have a sanitary connection outlet shall have at least a 1/4 in. per ft. (21 mm per m) pitch to the outlet.

D2.7 Metal tanks

D2.7.1 Metal tanks used as surge tanks, distribution tanks, and receivers shall comply with 3-A Sanitary Standards for Uninsulated Tanks for Milk and Milk Products, Number 32.

D2.8 Cleaning and Inspectibility

D2.8.1 Milking systems that are to be mechanically cleaned shall be designed so that the product contact surfaces of the milking system and all nonremoved appurtenances thereto can be mechanically cleaned and are easily accessible and readily removable for inspection and the following:

D2.8.1.1 Each separate cleaning circuit, including product and solution lines, shall be provided with a sufficient number of access points, such as valves, fittings or removable sections to make possible adequate inspections and examinations of representative interior surfaces.

D2.8.2 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.

D2.8.3 All product contact and solution contact surfaces shall be cleanable, either when in an assembled position or when removed. System appurtenances shall be accessible for inspection. Removable parts shall be readily demountable.

D2.9 Plastic or rubber hoses used under vacuum, such as vacuum tubes, long pulse tubes, milk hoses, short milk tubes, inflations, and drop lines for mechanical cleaning, may utilize slip-on connectors.

D2.10 All sanitary fittings and connections shall conform to the 3-A Sanitary Standards for Sanitary Fittings for Milk and Milk Products, Number 63-, 3-A Sanitary Standards for Plug-Type Valves for Milk and Milk Products, Number 51-, 3-A Sanitary Standards for Thermoplastic Plug-Type Valves for Milk and Milk Products, Number 52-, or 3-A Sanitary Standards for Compression-Type Valves for Milk and Milk Products, Number 53-, except that plastic fittings and connections that comply with Section C2.3.1 and glass fittings and connections that comply with Section C2.1 may be used.

D2.11 Lines and fittings for the application of air under pressure shall comply with the applicable provisions of 3-A Accepted Practices for Air Under Pressure in Contact with Milk, Milk Products, and Product Contact Surfaces, Number 604.

D2.12 Springs

D2.12.1 Any coil spring having product contact surfaces shall have at least 3/32 in. (2.38 mm) openings between coils, including the ends when the spring is in the free position.

D2.13 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 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.

D2.14 Nonproduct Contact Surfaces

D2.14.1 Nonproduct contact surfaces shall have a smooth finish, free of pockets and crevices, and be readily cleanable. Surfaces to be coated shall be effectively prepared for coating to assure adhesion.

E FABRICATION - SPECIFIC ITEMS

The following are requirements for specific items.

E1 Milking Machine Pails and Transfer Stations

A tipping handle, located near the bottom, shall be provided on a floor type pail. Handles and brackets shall be permanently attached to the equipment. A lid shall be provided for both floor and suspended-type pails. Bails, handles, chimes, and legs on both types of milking machine pails shall be considered nonproduct contact surfaces.

E1.1 Lids or covers shall be provided for milking machine pails, milk carrying pails, and transfer station receptacles. Lids on transfer station receptacles shall be self closing. All ungasketed lids shall have overlapping edges turned down at least 3/8 in. (9.52 mm) below the top of the milk pail or receptacle. The lids or covers on the milking machine pails, milk carrying pails, and transfer stations shall be pitched to an outside edge(s) so as to be free draining.

E1.2 The transparent plastic tubing used in conjunction with a transfer station shall be one continuous piece.

E1.2.1 Equipment for air drying transfer tubing shall be provided. The air drying equipment shall comply with the applicable provisions of the 3-A Accepted Practices for Air Under Pressure in Contact with Milk, Milk Products, and Product Contact Surfaces, Number 604.

E1.3 Pumps used for product contact, if supplied, shall conform to the 3-A Sanitary Standards for Centrifugal and Positive Rotary Pumps for Milk and Milk Products, Number 02.

E1.4 Pumps, when used, shall be actuated by a milk level sensing device. All product contact surfaces of the device shall be readily demountable for inspection and shall be located so that all of the product contact surfaces are

- reached by rinse, wash, and sanitizing solutions.
- E1.5 The carriage shall be constructed of smooth corrosion resistant material. Tires shall be smooth and without threads.
- E2 Milker Claws**
- E2.1 Nipples for long and short milk tubes shall be flush with the interior surface of the claw bowl.
- E2.2 The claw shall be designed so that cleaning and sanitizing solutions will drain when the claw is in the cleaning and sanitizing position.
- E2.3 Automatic cluster removers, when used, shall shut the vacuum off to the claw prior to removal to prevent extraneous material from being drawn into the cluster. The design and/or adjustment shall be such that the cluster is not dragged across the floor at removal.
- E3 Sanitary Check Valves**
- E3.1 A bucket type milking machine shall be provided with a sanitary check valve or other device that will prevent moisture or any contaminating substance from entering the milk from the vacuum system. A sanitary check valve or other device that will pass the test methods found in Appendix, Section J is considered to meet this provision.
- E3.2 The movable portion of the sanitary check valve shall be of one piece construction or the parts shall be bonded together.
- E4 Filters**
- E4.1 Filters shall conform to the 3-A Sanitary Standards for Milk and Milk Products Filters Using Disposable Filter Media, Number 10.
- E4.2 Wire mesh or woven material shall not be used for the filter medium support.
- E5 Milk Lines and/or Milk Transfer Lines and/or Wash Lines**
- E5.1 All solution contact surfaces shall be at least as smooth as a No. 4 ground finish on stainless steel sheets except as provided in Section D2.1.1.1.
- E5.2 Permanently mounted product and solution pipelines shall have sanitary fittings or welded joints.
- E5.3 All product contact sanitary pipeline (tubing) shall conform to the 3-A Sanitary Standards for Polished Metal Tubing for Dairy Products, Number 33- or be of a clear, heat resistant glass.
- E5.4 Milk lines shall be supported so that they remain in alignment and position. (See Appendix, Section S.) The support system shall be designed so as to preclude electrolytic action between support(s) and milk line(s).
- E5.5 Each separate cleaning circuit, including product and solution pipelines (wash lines), shall be provided with a sufficient number of access points, such as valves, fittings, or removable sections to make possible adequate inspection and examination of representative interior surfaces. All mechanically cleaned milk line product contact surfaces shall be exposed to cleaning and sanitizing solutions during cleaning.
- E5.6 The milker unit (cluster and long milk tube) cleaning manifold shall not be located in the milk line.
- E5.7 Milk lines and wash lines shall be self-draining except for normal clingage, and shall have a minimum continuous slope of at least 1 in. per 10 ft (8.3 mm per m) from a high point. (Also see Section E8.2 and E8.5.)
- E5.8 Milk inlets and milk inlet valves, where provided, shall be self-draining into the milk lines and/or milk transfer line and installed so that milk enters the upper half of the milk line. All milk inlet valves shall be supplied with closures which are readily applied and are of sanitary design.
- E5.9 The milk line and/or milk transfer line couplings or unions shall not be located in openings in walls, solid partitions, etc. through which the milk line and/or milk transfer lines pass. Where necessary, protective shields shall be used. The openings between the milk line and wall shall be protected to prevent the entrance of flies and other insects into the milkroom.
- E5.10 Milking systems shall be physically disconnected from the cleaning make-up vats during milking to avoid contamination by solution in the vat.
- E5.11 Milk lines shall be installed so that the vertical distance from the platform on which the cow stands to the center of the milk line, does not exceed 7 ft (2.1m) when milk is moved by vacuum directly from the milker unit assembly to the milk line except for cross overs. Opaque long milk tubes shall not exceed 8 ft (2.4 m) in length.
- E5.12 There shall be no risers in the milk line. Any upward slope encountered by the milk moving toward the receiver is considered a riser. Vertical sanitary pipelines, such as cross over pipelines, which do not convey milk are not considered risers.

- E5.13 In a pipeline milking system, there shall be no cross-connection(s) between the safe water supply and any unsafe or questionable water supply, or any source of pollution through which the safe water supply might become contaminated. For example, a connection between the water supply piping and solution make-up tank, unless protected by an air gap or effective back-flow preventer, constitutes a violation of this practice.
- E5.14 A milk transfer line connecting the milk pump or releaser and milk cooling and holding tank shall be a rigid pipe or tube with welded joints or permanently installed sanitary fittings.
- E6 Vacuum Pumps**
- E6.1 Oil-containing exhaust from a vacuum pump shall not terminate in a milking barn, stable, parlor, milkroom or feedroom.
- E7 Vacuum Regulators and Air Admission**
- E7.1 During the milking cycle a regulator shall not admit air directly into the milk line.
- E7.2 Air may be admitted into the milk line and/or milk transfer line for purposes of "shut down" by valves or other acceptable means located in the milkroom only. A valve for "shut down" purposes may not be installed in nonproduct contact lines unless a check valve is installed adjacent to the sanitary trap and in such a manner that will permit air to travel only to the vacuum pump.
- E7.3 Air admission bleed holes (or air vents), if provided, shall be in the upper half of the claw or claw bowl when it is in the milking position or in the teatcup assembly.
- E7.4 An air injector, if provided, shall be located to admit clean air into the pipeline during the washing process. The timing and air-to-water ratio shall be adjusted so all surfaces are exposed to wash solution with enough turbulence to clean the system. The air injector shall be designed, installed, and operated so that air is not admitted during milking. Air injectors shall be located in the milk house or room of equivalent cleanliness, or shall be provided with an appropriate filter and properly protected from contamination. Air injectors mounted on the milk line shall be of sanitary design.
- E8 Main Air Lines and/or Pulsator Air Lines**
- E8.1 Main air lines and/or pulsator air lines shall be supported in such a manner that the lines will properly drain.
- E8.2 Main air lines and/or pulsator air lines shall be pitched at least 1/2 in. in 10 ft (4.2 mm per m), preferably in the direction of air flow.
- E8.3 An automatic drain valve or a self draining sanitary trap shall be installed at the bottom of all risers which are not self-draining.
- E8.4 Stall cocks shall enter the upper half of the line.
- E8.5 In a pipeline milking machine, a self-draining sanitary trap shall be provided whenever the milk line or a permanently installed solution pipeline (wash line) is connected to a vacuum supply line. The trap shall be installed adjacent to the milk receiver, releaser, wash vacuum pipeline or vacuum milk holding tank and connected by readily disassembled sanitary piping. From the top intersection of the outlet on the receiver, the vertical rise of this connection shall not exceed 12 in. (30.5 cm) as measured to the bottom of the connecting elbow. The connecting sanitary piping shall slope toward the sanitary trap at least 1/2 in. (13 mm) in the first 2 ft (61 cm) and the remainder of the pipe shall slope a minimum of 0.8%. The sanitary trap shall be installed so that any liquid collected in the sanitary trap cannot get back into the receiver, releaser, or vacuum milk holding tank. Sanitary traps designed for mechanical cleaning may be cleaned by reverse flow.
- E8.6 If a distribution tank is used, it shall be self-draining except for normal clingage.
- E9 Milk Receiver, Pump, and Releaser**
- E9.1 The milk level sensing device shall be designed so that milk will not reach the lowest inlet in the milk receiver.
- E9.2 When a centrifugal or positive rotary type milk pump is used to remove the milk from the receiver, it shall conform to the 3-A Sanitary Standards for Centrifugal and Positive Rotary Pumps for Milk and Milk Products, Number 02-. The pump shall be located so that it is readily accessible for cleaning and/or inspection.
- E9.3 The pump shall be actuated by a level sensing device. All product contact surfaces of the device shall be readily demountable for inspection and shall be located so that all of the product contact surfaces are reached by the rinse and wash solutions.
- E9.4 A releasing mechanism, when provided, shall be of a sanitary design, and operated so that the milk will not reach the lowest milk inlet of the receiver during milking.

- E9.5 The pump and interconnecting piping shall be installed so that they are self-draining except for normal clingage. Drains shall terminate above the floor and shall not be connected to sewage lines.
- E10 The teatcup jettors in the parlor shall be covered during milking.
- E10.1 Cluster cleaning devices such as teatcup jettors, when installed outside the milkroom, shall be constructed as to prevent insects, rodents, dirt, dust, and other contaminants from gaining access to milk contact surfaces and solution contact surfaces. They shall provide complete drainage, except for normal clingage, of clusters, long milk tubes, and solution contact surfaces.
- E11 **Automatic Backflush Systems**
- E11.1 When backflush is used, it shall include a valve between the claw and the milk inlet which provides a complete separation, with an air gap, between the solution inlet and milk line.
- E11.2 The backflush cycle shall include a pre- and post-rinse with safe water.
- E11.3 After final rinse, any remaining water shall be blown from the cluster with compressed air or removed from the unit by vacuum. This is to be accomplished before the valve returns to the milking position.
- E11.4 If compressed air is used to blow water from the unit or injected into the sanitizer or rinse solution, the air must be produced using equipment conforming with the 3-A Accepted Practices for Supplying Air Under Pressure in Contact with Milk, Milk Products and Product Contact Surfaces, Number 604.
- E12 **Heat Exchangers**
- E12.1 When plate heat exchangers are used as milk coolers in milking systems, they shall conform to 3-A Sanitary Standards for Plate Heat Exchangers for Milk and Milk Products, Number 11-.
- E12.2 When tubular heat exchangers are used as milk coolers in milking systems, they shall conform to 3-A Sanitary Standards for Tubular Heat Exchangers for Milk and Milk Products, Number 12-.
- E12.3 Other types of heat exchangers, such as refrigerated receivers, if used as milk coolers in milking systems, shall conform with the applicable criteria in Sections C and D of 3-A Accepted Practices for the Design, Fabrication and Installation of Milking and Milk Handling Equipment, Number 606.
- E12.4 Recirculated cold water which is used in plate or tubular heat exchangers shall be from a safe source, shall be nontoxic, and shall be protected from contamination. Such water shall be tested semiannually and shall comply with appropriate bacteriological standards.
- F **MANUFACTURER'S INSTRUCTIONS**
- F1 The manufacturer shall furnish instructional charts and literature on milking systems giving the maintenance schedules and operational instructions. This shall include the recommended assembly and disassembly procedures of all components. It shall also include lubrication and maintenance schedules for vacuum pumps, milk pumps, pulsators, and vacuum regulators.
- G **APPLICATION TO INSTALL PIPELINE MILKING MACHINES**
- G1 Prior to the installation of a pipeline milking machine, the producer shall first make application on a suitable form, as prescribed by the control authority, or in the absence of a required form, on a form as suggested herein (See Appendix, Section U). The producer shall provide the control authority with two copies of the necessary details and flow diagrams. Approval of the application shall be obtained prior to the starting of installation.
- G2 Changes in existing milking systems, affecting capacity or arrangement, shall be submitted to the control authority.
- APPENDIX**
- NOTE:** This Appendix is an adjunct to the preceding section of these practices. Its purpose is to provide supplemental information and nonnormative guidance in the design, fabrication and installation of milking machines.
- H **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 C1.2 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 specifications⁴ A351/A351M, A743/A743M and A744/A744M.

I 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 $\mu\text{in.}$ (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.

J PROCEDURES FOR TESTING SANITARY CHECK VALVE PERFORMANCE ON BUCKET-TYPE MILKERS

J1 This procedure has been devised to test the performance of the sanitary check valve on bucket-type milking machines using a laboratory installation of the vacuum system. The only variations in the vacuum system used in this test (See Figure 1) from that used on dairy farms are: (a) a stall cock between the vacuum pump and the controller, as a means of controlling the vacuum, and (b) location of a vacuum gauge between the two stall cocks to which the units are attached during the test. The test should be conducted in the following manner using only the facilities outlined in the accompanying drawing:

- J1.1** Set up pump, controller, trap, and stall cocks as indicated in Figure 1.
- J1.2** Assemble two clean, dry milking machine units.
- J1.3** Start the vacuum pump. Attach the vacuum tube to the stall cocks and apply vacuum to both units. Adjust the vacuum and pulsator speed to those recommended by the manufacturer.
- J1.4** Reduce the vacuum in the system by opening the vacuum controlling valve at the pump until the needle on the gauge just starts to drop, not exceeding 1/2 in. of mercury (1.72 kPa) vacuum below the normal milking vacuum recommended by the manufacturer. (See step J1.3.)
- J1.5** While the units are under vacuum, inject 5 ml of water with a syringe into the vacuum tubes of each unit, approximately 4 in. (101.6 mm) from the check valve.
- J1.6** Admit air through the teatcups to one of the units to produce a momentary 4 in. of mercury (13.7 kPa) drop in vacuum (or the

maximum drop permitted by the design of the machine), indicated on the vacuum gauge.

J1.7 Close the stall cock to which the vacuum tube of this unit is attached, remove the vacuum tube, and release the vacuum in the pail in the normal manner. (The vacuum tube must be maintained in a position favoring drainage toward the check-valve, as is the case when a unit is routinely moved from one stall cock to another.) The pail or container lid is not to be removed.

J1.8 Immediately attach this unit again to the stall cock, open stall cock, and re-establish the normal operating vacuum.

J1.9 Follow steps J1.6, J1.7 and J1.8 with the other unit.

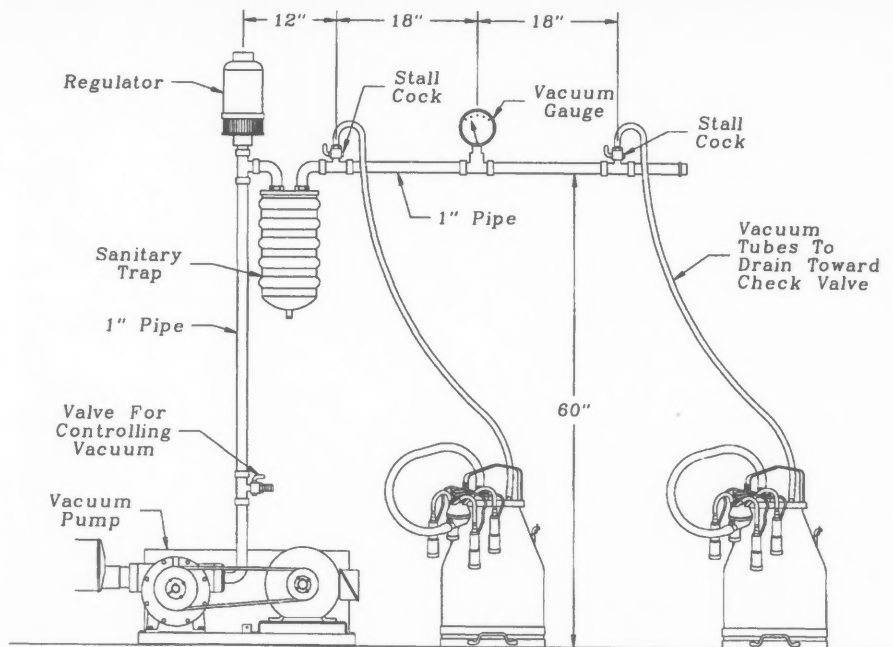
J1.10 Repeat steps J1.5 to J1.8 inclusive, alternatively with the two units, five additional times (so that 30 ml of water will have been injected into each air hose.) Then release the vacuum and carefully remove and examine the lid, the check valve, and the interior of the pail of each unit, separately. The presence of moisture on the underside of the check valve, on the underside of the lid, or in the pail indicate failure of the check valve to function effectively in preventing backflow of potential contamination and indicates non-conformance to the requirement of E3.1.

K SPECIFICATIONS FOR VISUAL INSPECTION OF CAST SURFACE FINISH

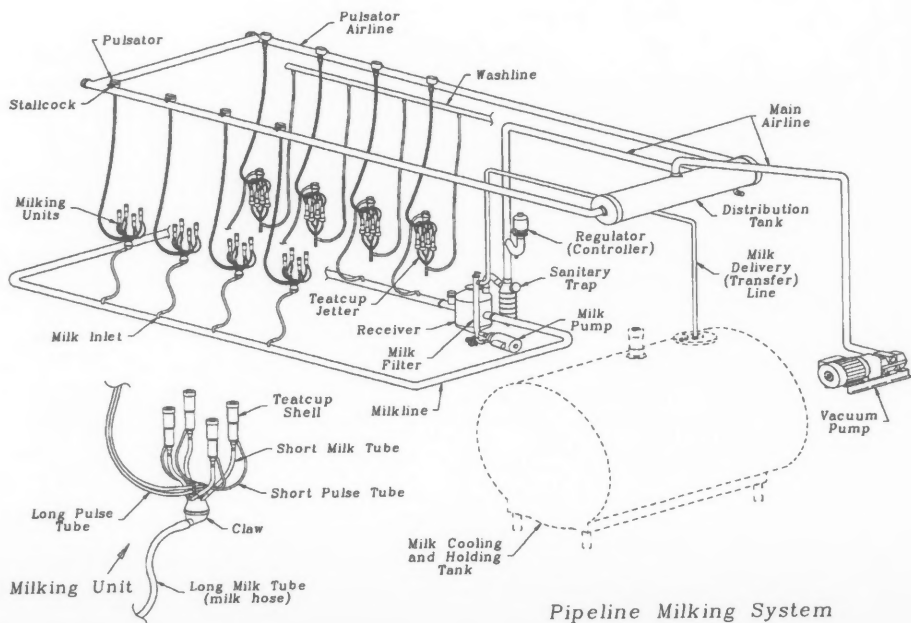
K1 Because RMS (root mean square) or R_a (roughness average) values are applicable strictly to machined surfaces, it is essential to use a scale of cast surfaces in designating the general surface smoothness desired on castings. The reason for establishing a visual standard is to overcome the obvious inadequacy of any arithmetic or geometric measuring system when applied to the surface of the casting.

K2 The ACI Surface Indicator Scale is the one to be used for the surfaces of castings for pumps or other appurtenances. (See subsection D2.1.1.1 of these Practices.) The scale provides a measure of the degree of general smoothness which can be attained on alloy castings by currently available processes. There are four surfaces shown on the scale.

K3 Copies of the Specification for Visual Inspection of Cast Surface Finish as well as the Surface Indicator Scale can be obtained from the Steel Founders' Society of America, Cast Metal Federation Building, 455 State Street, Des Plaines, IL 60016, (708) 299-9160.



- Note:
1. Install Regulator And Vacuum Gauge Per Manufacturers Specifications.
 2. Stall Cocks To Be Positioned Per Manufacturers Specifications.



L INSTALLING, SIZING AND PERFORMANCE GUIDELINES

The installing, sizing, and performance guidelines outlined in American Society of Agricultural Engineers (ASAE) Standard: ASAE S-518 Milking Machine Installations, Construction and Performance⁶ should be followed.

M MAIN AIR LINES AND/OR PULSATOR AIR LINES

M1 Pipe and fittings used in main air lines and/or pulsator air line installations should be capable of withstanding vacuums of 25 in. (635 mm) of mercury without collapsing.

M2 Pulsator air lines should be looped to (1) a vacuum distribution tank or (2) a vacuum pulsator header line. A single header line should be a minimum of one size larger than the pulsator air line, unless the pulsator air line is sized larger than the minimum size specified in ASAE S-518. (See Appendix, Section L.)

N MILK LINE AND VACUUM SYSTEM CAPACITY

N1 The milk line size should be deemed to be sufficient if, upon installation of a milking system, it meets the maximum milk line vacuum drop in accordance with Appendix, Section L.

N2 The vacuum system should be deemed to have sufficient capacity if, upon installation of a milking system, it meets the vacuum capacity and reserve performance criteria in accordance with Appendix, Section L.

O OPERATION, MAINTENANCE, AND SERVICE

O1 Installation Check

O1.1 It is recommended that immediately after installing, the installer should perform the dynamic milk test according to ASAE EP 445 - Test Equipment and Its Application for Measuring Milk Handling Equipment.

O.2 Service Check

O2.1 It is strongly recommended that a complete service check and milking system performance evaluation be performed by an authorized milking machine dealer on an hourly use basis as recommended by the machine manufacturer or at least once a year. The suggested test should include (1) operating vacuum level, (2) vacuum pump capacity, and (3) effective reserve. It is highly desirable that a service report and milking system test report be supplied by the milking

machine manufacturer and followed closely by their authorized dealer during the service check. A copy of the completed report should be furnished to the owner.

O3 Vacuum System

The following recommendations, if followed, should aid in trouble-free operation of the vacuum system.

O3.1 Vacuum Pump

O3.1.1 Use only oil recommended by the manufacturer and maintain it at proper level. Change oil as frequently as recommended by the manufacturer.

O3.1.2 Consult a qualified dealer and the control authority before adding units to a milking system.

O3.1.3 Keep pulleys and belts free of oil and grease. Check the operator's manual for the proper belt tension. Keep shields and guards in place.

O3.2 Check the pulsator(s) as recommended by the manufacturer to see that it is properly adjusted.

O3.3 Check vacuum tubes and main air lines and/or pulsator air lines weekly, and clean as needed. Any leak in the vacuum pipeline should be corrected immediately.

O3.4 Check for vacuum leaks in all stall cocks, milk inlets, valves, gaskets, and other fittings.

O3.5 Check and clean vacuum regulator and sanitary traps weekly.

O4 Milker Units

O4.1 Teatcup liners or inflations should be changed as recommended by the manufacturer and damaged parts should be replaced immediately.

O4.2 Only milk hoses, short milk tubes, short pulse tubes, long pulse tubes, and vacuum tubes of the recommended inside diameter should be used. Hoses and tubes should be kept free of obstructions and kinks.

P RELEASER

P1 The operation of the releaser should not cause the vacuum in the system to drop more than 1 in. (25.4 mm) of mercury.

Q TRANSFER STATIONS

Q1 To prevent excessive agitation and incorporation of air into the milk, pump type stations should be equipped with level sensing devices to start and stop the pump motor. Vacuum operated stations should be equipped with check valves for the same purpose.

R CLEANING AND SANITIZING PROCEDURES

R1 A rinsing, cleaning, and sanitizing regimen which has been demonstrated to be effective should be employed. Prior to installation, a description of the cleaning regimen that has been determined to be effective should be made available to the producer. Because of the possibilities of corrosion, the recommendations of the cleaning compound manufacturer should be followed with respect to the time, temperature, and the concentration of specific detergent solutions and bactericides. To insure proper strength of solution and to avoid corrosion, the cleaning compound should be completely dissolved or dispersed prior to circulation. One regimen found to be satisfactory is as follows:

- R1.1 Immediately after concluding each milking, all connections between wash lines and milking equipment are made; equipment which is not included in the cleaning circuit is removed, the openings are capped, by-pass connections are made, and lines are rinsed thoroughly with tepid water at 90° to 105°F (32° to 40°C) entering circuit, continuously discarding the water at the downstream end of the solution return line until the discarded effluent is clear.
- R1.2 All solution and product contact surfaces not cleanable by mechanical cleaning procedures such as valves, slip joints, milk inlets, etc. should be cleaned manually.
- R1.3 An effective detergent solution should be circulated for a period of time at a concentration and temperature capable of effectively removing the soil residue in the circuit.
- R1.4 The detergent solution should be thoroughly rinsed from the circuit with an acid solution.
- R1.5 Immediately prior to the next milking, the line should be rinsed with clean water to which an approved sanitizing agent has been added. Then let drain before starting to milk.
- R2 Provisions should be made for adequate warm water under pressure to be available for cleaning the outside or nonproduct contact surfaces of the cluster including tubes. Dismantling for replacing rubber parts and/or manual cleaning of product contact surfaces should be done in the milkroom.
- R3 Provide means by which milk measuring devices which are not mounted permanently on the milking system but are used occasionally (for example, monthly) can be cleaned per manufacturer's recommendations.
- R4 Water heating capacity is considered adequate if the detergent solution in the wash vat is maintained at a minimum of 120°F (50°C). Manufacturer's recommendations for water requirements should be followed. Use the

information below to determine the amount of water to wash the milking system.

R4.1 Hot Water Requirements

Calculate the amount of hot water in the vat for washing per the following table. The amounts are valid for an ambient temperature down to 50°F (10°C) and when the water temperature is

Component	Water Requirement
1 1/2 in. (33.10 mm) Drawlines, Wash Lines, and Milk Lines	0.4 gal/10 ft (0.5 L/m)
2 in. (50.80 mm) Drawlines, Wash Lines, and Milk Lines	0.6 gal/10 ft (0.7 L/m)
2 1/2 in. (63.50 mm) Milk Lines	0.8 gal/10 ft (1.0 L/m)
3 in. (76.20 mm) Milk Lines	1.2 gal/10 ft (1.5 L/m)
1 1/2 in. (38.10 mm) Discharge Line	0.8 gal/10 ft (1.0 L/m)
2 in. (50.80 mm) Discharge Line	1.4 gal/10 ft (1.7 L/m)
Weigh Jar	1.0 gal (3.78 L)/unit
Milk Meter	0.5 gal (1.89 L)/unit
Receiver	3.0 gal (11.34 L)/receiver
Vat	Additional 7.0 gal (26.5 L) or 25% of above (use larger value)

at least 160°F (71.1°C) at the start of the washing cycle, i.e. start of vacuum pump.

At colder ambient temperature, wash with more hot water or start at a higher water temperature. For example, at 30°F (-1.1°C) ambient temperature, 20-25% more water must be added or wash must start at 175° to 180°F (79.4° to 82.2°C). If wash starts at a lower 150°F (65.6°C) water temperature, add about 25% more hot water.

S MILK LINE OR WASH LINE SUPPORTS

- S1 Permanently installed pipeline supports should not be suspended from ceiling or joists in barns in which heavy feed, etc. is stored overhead. Supports should be spaced no more than 10 ft (3050 mm) apart. A support should be provided within 2 ft. (610 mm) of every direction change.

T REFERENCES

- T1 3-A Sanitary Standards for Centrifugal and Positive Rotary Pumps for Milk and Milk Products, Number 02.
- T2 3-A Sanitary Standards for Milk and Milk Products Filters Using Disposable Filter Media, Number 10.
- T3 3-A Sanitary Standards for Plate Type Heat Exchangers for Milk and Milk Products, Number 11.

- T4 3-A Sanitary Standards for Tubular Heat Exchangers for Milk and Milk Products, Number 12.
- T5 3-A Sanitary Standards for Farm Milk Cooling and Holding Tanks, Number 13.
- T6 3-A Sanitary Standards for Multiple-Use Rubber and Rubber-Like Materials Used as Product Contact Surfaces in Dairy Equipment, Number 18.
- T7 3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Number 20.
- T8 3-A Sanitary Standards for Farm Milk Storage Tanks, Number 30.
- T9 3-A Sanitary Standards for Uninsulated Tanks for Milk and Milk Products 32.
- T10 3-A Sanitary Standards for Polished Metal Tubing for Dairy Products, Number 33.
- T11 3-A Sanitary Standards for Pressure and Level Sensing Devices, Number 37.
- T12 3-A Sanitary Standards for Plug-Type Valves for Milk and Milk Products, Number 51.
- T13 3-A Sanitary Standards for Thermoplastic Plug-Type Valves for Milk and Milk Products, Number 52.
- T14 3-A Sanitary Standards for Compression-Type Valves for Milk and Milk Products, Number 53.
- T15 3-A Sanitary Standards for Sanitary Fittings Used for Milk and Milk Products, Number 63.
- T16 3-A Accepted Practices for Supplying Air Under Pressure in Contact with Milk, Milk Products, and Product Contact Surfaces, Number 604.
- U **APPLICATION TO INSTALL PIPELINE MILKING SYSTEMS**
- U1 After application has been made, as in Section G, the applicant should be notified promptly of any necessary changes.
- U2 Each "type" of a manufacturer's standards unit may be made available by the dealer to the proper control authority, for general approval for installation in the control authority's jurisdiction at anytime. It is recognized that any manufacturer's so-called standards do not fit all operating conditions of all users. Therefore, if any installation requires deviations from the standards already generally approved for use in the jurisdiction, the details of all deviations must be submitted with the initial application for installation and approval received prior to the installation. It is urged that deviation details thus submitted be acted upon by the control authority promptly after being received.
- U3 It is recommended that all milk control authorities adopt an "Application to Install or Modify a Milking System" form.

¹The data for this series are contained in the *AISI Steel Products Manual, Stainless & Heat Resisting Steels*, November 1990, Table 2-1, pp. 17-20. Available from the American Iron and Steel Society, 410 Commonwealth Drive, Warrendale, PA 15086 (412) 776-1535.

²Steel Founders Society of America, Cast Metal Federation Building, 455 State Street, Des Plaines, IL 60016 (708) 299-9160.

³Adhesives 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.

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

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

⁶Available from American Society of Agricultural Engineers, 2950 Niles Road, St. Joseph, MI 49085-9659 (616) 429-0300.

APPLICATION TO INSTALL OR MODIFY A MILKING SYSTEM

Date: _____

Name of Producer: _____

Address: _____

State and Zip Code: _____

Phone/Fax: _____

Producer's Regulatory License or Permit Number: _____

Milk Dealer or Buyer: _____

I HEREBY MAKE APPLICATION FOR PERMISSION TO INSTALL OR MODIFY A MILKING SYSTEM TO BE MECHANICALLY CLEANED IN PLACE. THIS EQUIPMENT WILL CONFORM TO OR EXCEED 3-A ACCEPTED PRACTICES FOR THE DESIGN, FABRICATION, AND INSTALLATION OF MILKING AND MILK HANDLING EQUIPMENT, NUMBER 604-.

I INSTRUCTIONS:

- A. All blanks that apply to this installation must be completed.
B. This application must be accompanied by a detailed legible drawing of the milking system showing the following:
- | | | |
|------------------------------------|------------------------|-------------------------------------|
| 1. High Point | 4. Air Injector(s) | 7. Milk Cooling and Holding Tank(s) |
| 2. Direction of Milk Flow | 5. Inspection Point(s) | 8. Milk Pre-Cooler(s) |
| 3. Receiver(s) or Transfer Station | 6. Wash Vat(s) | |

II FABRICATION OF MILKING SYSTEM:

- A Milk Line:**
- | | |
|-----------------------|--|
| 1. Material(s) _____ | 6. Number of Slopes _____ |
| 2. Diameter _____ in. | 7. Slope _____ in. per 10 ft |
| 3. Length _____ ft | 8. High Line _____ |
| 4. Welded _____ | 9. Maximum Height from Floor _____ in. |
| 5. Gasketed _____ | 10. Low Line _____ |
- B Receiver:**
- | | |
|------------------------------------|--------------------------------------|
| 1. Number of Inlets _____ | 3. Size of Vacuum Inlet _____ in. |
| 2. Size of Milk Inlet(s) _____ in. | 4. Sanitary Trap: Yes _____ No _____ |
- C Auxiliary Milking Equipment:**
- | | Number | Brand |
|------------------------------|-----------------------------|-------|
| 1. Milk Meter(s) | _____ | _____ |
| 2. Milk Weighing Device(s) | _____ | _____ |
| 3. Automatic Take-Off | _____ | _____ |
| 4. Automatic Backflush | _____ | _____ |
| 5. End of Milking Indicators | _____ | _____ |
| 6. Milk Filtration | _____ | _____ |
| 7. Transfer Station | Vacuum _____ Electric _____ | _____ |
| 8. Other (specify) _____ | | _____ |

- D Vacuum System:**
1. Main Air Line Material _____ Diameter _____ in. Length _____ ft
 2. Pulsator Air Line Material _____ Diameter _____ in. Length _____ ft
 3. Automatic Drains in Pulsator Air Lines Yes _____ No _____
 4. Number of Clusters _____
 5. Vacuum Pump(s) Brand _____ Model(s) _____ hp _____
 6. Total Vacuum Pump Capacity _____ CFM/ASME at 15 in. Hg.
 7. Vacuum Regulator Brand _____ Model _____
 8. Number of Distribution Tank(s) _____
 9. Other (specify) _____

- E Milk Cooling and Storage System:**
1. Pre-Cooler _____ Brand(s) _____ Type _____ Number _____
 2. Type of Coolant(s) _____
 3. Milk Cooling & Holding Tank Brand _____ Model _____ Serial No. _____
Milk Capacity _____ Cooling Capacity BTU/hr _____

F Cleaning and Sanitizing System:

NOTE: Water temperature of the wash cycle must be maintained at 120°F or higher.

1. Automatic _____ Manual _____
2. Automatic Pre-Rinse Diverter Valve _____
3. Wash Procedure Pre-Rinse _____ gallons
Wash Cycle _____ gallons Time _____ minutes
Acid/Post Rinse _____ gallons
Sanitize _____ gallons
4. Teatcup Jetters Yes _____ No _____

G Water Heating Equipment:

1. Type of Heater Electric _____ Gas _____ Other _____
2. Capacity of Heater _____ gallons
3. Recovery Rate Gal/HR/100 Degree Rise _____ gallons
4. Additional Water Heating _____ Type _____

H Manually Cleaned Components: (Circle all that apply)

Diverter Plug(s) Manual Shut-Off Valve(s) Milk Tank Outlet Valve(s)

List other components in this system: _____

I Physical Separation of Wash System (Lines) From:

1. Milking System During Milking Yes _____ No _____
2. Milk Tank During Milk Storage Yes _____ No _____

J Initial Dynamic Test

Performed Yes _____ No _____ Date _____

**A CLEANING PROGRAM INCLUDING WATER HARDNESS, DETERGENT AND SANITIZER
MUST BE POSTED IN THE MILK ROOM**

The posted chart shall be legible and protected to provide a degree of permanency. If procedure is changed in any way, a new program must be posted.

ANY FUTURE MODIFICATION OF THIS EQUIPMENT MUST HAVE PRIOR WRITTEN APPROVAL

Owner or Authorized Representative: _____
Signature

Installer/Dealer: _____
Signature

Address

Phone Number

OFFICIAL ACTION

1. Plan Approval

Fieldman: _____
Signature Date

Regional Sanitarian: _____
Signature Date

2. Installation Approval

Regional Sanitarian: _____
Signature Date

These revised practices are effective November 23, 1996, at which time the 3-A Accepted Practices for Design, Fabrication and Installation of Milking and Milk Handling Equipment, Number 606-03 are rescinded and become null and void.

The index and/or table of contents has been removed and photographed separately within this volume year.

For roll film users, this information for the current volume year is at the beginning of the microfilm. For a prior year volume, this information is at the end of the microfilm.

For microfiche users, the index and/or contents is contained on a separate fiche.

IAMFES FINANCIAL STATUS
SEPTEMBER 1, 1995 TO AUGUST 31, 1996

Cash on Hand		
September 1, 1995	276,023	
Cash Flow from Operations:		
REVENUE:		% of Total Revenue
Advertising	129,771	11.68
Membership	283,872	25.54
Communication	445,462	40.08
Administrative	27,413	2.47
Annual Meeting	193,323	17.40
Workshops	8,085	0.73
Feagan Award Fund	1,561	0.14
Restricted Fund	1,686	0.15
Foundation Fund	20,093	1.81

Total Revenue 1,111,266 100.00

EXPENSE:		
Salaries & Benefits	354,980	31.94
Building Operations	43,248	3.89
Office Operations	106,030	9.54
Professional Services	80,689	7.26
Publications	315,827	28.42
Travel	5,975	0.54
Executive Board	14,424	1.30
General Committee	4,588	0.41
Annual Meeting	139,635	12.57
Workshops	5,278	0.47
Feagan Award Fund	0	0.00
Restricted Fund	6,847	0.62
Foundation Fund	12,993	1.17

Total Expense 1,090,514 98.13

Revenue Less Expense 20,752* 1.87

Change In:
Asset/Liability Accounts (20,829)

Net Cash Flow from Operations (77)

Investing Activities:
Equipment Purchases (12,733)

Net Change in Cash Flow (12,810)

Cash on Hand 263,213
August 31, 1996

* Revenue Generated by Fund

General Fund	17,252
Feagan Fund	1,561
Restricted Fund	(5,161)
Foundation Fund	7,100

Revenue Less Expense 20,752

None So Pure

SANITARY PETROL-GEL LUBRICANT

WHITE MINERAL OIL
USP Ingredients
PURELY TASTELESS,
ODORLESS
High Melting Point.
Will not taint when
coming in contact with
food products.
Impervious to water.

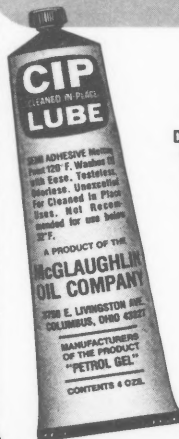
MANUFACTURED BY
McGLAUGHLIN OIL COMPANY
3750 E. LIVINGSTON
COLUMBUS, OH

Write for
FREE
Trial Tube

Lube Daily with PETROL-GEL

The ideal sanitary lubricant, Petrol-Gel is tasteless and odorless. Recommended uses: Stainless Steel Valves, Ice Cream Freezers, Homogenizer Pistons, Guide and Slide Mechanisms, Centrifugal Pumps, Continuous Freezers, Gaskets and Seals, and "O" Rings. The U.S. Department of Agriculture has approved the ingredients or component parts of materials used in the making of Petrol-Gel.

PACKAGED 6 & 12 four ounce tubes



CIP LUBE

Developed specifically to meet the demand for a lubricant for use with stationary or in-place cleaning. Washes off easily—no dismantling of tubing, valves, gaskets and seals. CIP Lube is used by most of the nation's leading dairies.

Write for **FREE** Trial Tube

McGlaughlin Oil Co.

3750 E. Livingston Ave.
Columbus, Ohio 43227

Coming Events

JANUARY 1997

• **6, B & G Chemical & Equipment Co., Inc. Annual Food Workshop — Food Pest Focus '97**, in Dallas, TX at the Dallas Medallion Hotel. One day program includes professional guest speakers, the most up-to-date information, exhibit hall with the latest products, and displays of improved application techniques. For further information, call Leah Springstead, Marketing and Training Coordinator, (214) 357-5741 or (800) 345-9387 ext. 133; fax (214) 357-1024.

• **14-15, Food Industry Conference**, in Costa Mesa, CA. Sponsored by Southern California Chapter of the Institute of Food Technologists. The subject will be Emerging Issues in Food Science, Nutrition, and Technology. The registration fee is \$125 for 2 days and \$75 for 1 day. For conference registration and information, call Jill Golden at (714) 432-5702.

• **15-18, International Dairy Foods Association 1997 Dairy Forum**, The Registry Resort & Spa, Fort Lauderdale, FL. For more information, contact Patrick Carroll at (202) 737-4332.

• **28-29, HACCP II**, sponsored by the Food Processors Institute in Dublin, CA. The core of this program concentrates on the various verification activities included in the Seventh Principle of HACCP. The course will explore these verification activities and how to implement them. Workshops using model HACCP plans are included. For additional information, call Customer Service at (202) 639-5954.

FEBRUARY

• **3-6, Basic Food Processing Sanitation Course**, Manhattan, KS. This course features the essential elements needed to develop and maintain today's modern food product safety programs. For additional information, contact AIB, 1213 Bakers Way, Manhattan, KS 66502-4576; (913) 537-4750; (800) 633-5137; (800) 242-2534; fax (913) 537-1493.

• **4-5, Food Science Course: Introduction to Food Microbiology**, Rutgers University, New Brunswick, NJ. For further information, contact Keith Wilson, Office of Continuing Professional Education, Rutgers University-Cook College, P.O. Box 231, New Brunswick, NJ 08903-0231; (908) 932-9271.

• **16-19, National Mastitis Council 36th Annual Meeting**, at the Hyatt Regency in Albuquerque, NM. The seminar is being jointly sponsored with the International Dairy Federation (IDF) A2 Group of Mastitis Experts. The objective of the meeting is to disseminate technical and applied information on udder health, mastitis management, milk quality and milk safety. For further information, contact Dr. Keith Sterner, Program Committee Chair, 2650 Ernest Rd., Ionia, MI 48846; phone (616) 527-3320; fax (616) 527-0277.

• **16-21, XV International Symposium of the World Association of Microbiologists, Immunologists and Specialists in Infectious Diseases (W.A.V.M.I.)**, will be held in Cyprus. The theme will be Salmonellosis - Brucellosis as World Health Problems for Humans and Animals. For additional information, contact K. Polydorou V.P.H. Institute, P.O. Box 284, Nicosia, Cyprus; Fax/Tel. (357-2-) 453121.

• **17-19, Annual Technical Seminar**, to be held at the University Centre Hotel in Gainesville, FL. For more details, call Sara Jo Atwell, (352) 372-0436.

• **25-27, Milk Protein Polymorphism II Seminar**, at the Steeple Conference Centre, Quality Hotel, Palmerston North, New Zealand. Presentations and discussions will be held on the processing characteristics of milks containing different milk protein variants, the relationship between genetic polymorphism and product functionality, the nutritional and health-related aspects of variant milk proteins, and provide a forum of new information about milk production traits as related to the polymorphism of milk proteins. For registration information contact, Mrs. Lynnette Dyer, NZDRI, Private Bag 11029, Palmerston North, New Zealand; Fax +64 6 356 1476.

• **27, Food Science Course: CPA 7D**, Rutgers University, New Brunswick, NJ. For further information, contact Keith Wilson, Office of Continuing Professional Education, Rutgers University-Cook College, P.O. Box 231, New Brunswick, NJ 08903-0231; (908) 932-9271.

MARCH

• **5-6, Food Science Course: Pest Management/Food Product Safety**, Rutgers University, New Brunswick, NJ. For further information, contact Keith Wilson, Office of Continuing Professional Education, Rutgers University-Cook College, P.O. Box 231, New Brunswick, NJ 08903-0231; (908) 932-9271.

• **10-12, North American Food Safety Educational Workshop – Food Service and Food Retailers**, in College Park, MD. This conference is intended for professionals interested in food safety related to grocery stores, convenience stores, and food service establishments including commercial, institutional, and military sectors. Emphasis will be given to challenges, barriers, and evaluation of training food service workers and the feasibility of applying HACCP to food service and retail. The cost of the workshop is \$150.00 before February 1, 1997. For further information, contact Lisa Gordon, North Carolina State University, phone (919) 515-2956; fax (919) 515-7124; e-mail lisa@unity.ncsu.edu.

• **18-19, Basic Food Microbiology Seminar**, at the Holiday Inn – Portland Airport, Portland, OR. In general, participants will be introduced to the characteristics of microorganisms (bacteria, yeast, and molds), how food is used as a growth medium by microorganisms to cause food spoilage, how to prevent food contamination and spoilage, the basics of foodborne illness, and the relationship of good manufacturing practices and personal hygiene to overall food safety. The concept of HACCP will also be introduced. The course is designed for individuals with limited microbiology or science backgrounds. For further information, contact Jack R. Brook, MS, RD, Instructor/Coordinator, Food Science Technology at (503) 667-7473 or fax (503) 667-7831.

• **18-21, Lipidex '97 Symposium & Tradefair**, in Antwerp, Belgium. This symposium programme is designed to be of benefit to a wide audience from the international oils and fats trade, with sessions that will appeal to traders, buyers and marketing executives, as well as those of interest to technical managers and delegates with operational responsibilities in production. For further information, contact Ms. Erika Vercauteren, The ANTWERP HILTON, Groenplaats, 2000 Antwerpen, Bel-

gium, Telephone (+32) 3 204 8279; fax (+32) 3 204 8640.

APRIL

• **8-9, Oregon Dairy Industries Annual Conference**, Eugene Hilton. For additional information, contact Lilly Smith, Oregon Dairy Industries, Food Science Dept., 100 Wiegand Hall, OSU, Corvallis, OR 97331-6602; phone (503) 745-5545; fax (503) 745-1018.

• **9-11, Food Science Course: Applied Sensory Evaluation**, Rutgers University, New Brunswick, NJ. For further information, contact Keith Wilson, Office of Continuing Professional Education, Rutgers University-Cook College, P.O. Box 231, New Brunswick, NJ 08903-0231; (908) 932-9271.

• **20-23, 48th Meeting of the Pacific Fisheries Technologists**, Astoria, OR. Topics will cover areas related to seafood processing, quality and safety. For more information, contact Michael Morrissey, fax (503) 325-2753; e-mail moorimic@ccmail.orst.edu

MAY

• **3-8, The 26th National Conference on Interstate Milk Shipments**, at the Hyatt Regency, San Francisco Airport. For further information, contact Leon Townsend, NCIMS Executive Secretary, 110 Tecumseh Trail, Frankfort, KY 40601. Telephone and/or fax (502) 695-0253.

• **5-6, Symposium on Texture of Fermented Milk Products and Dairy Desserts**, in Vicenza, Italy. The objective of the seminar is the presentation and discussion of new information about the different factors affecting the texture of fermented milk and dairy desserts. Besides the key factors influencing the texture of products, an up-to-date will be given on the instrumental and sensory evaluation of texture. For further information, contact Symposium Secretariat, Istituto Sperimentale Lattiero-Casario,

Dr. Roberto Giangiacomo, Via A. Lombardo, 11, 20075 LODI-ITALY; phone +39-371-430990; fax +39-371-35579.

• **13-14, Fourth Annual Cultured Dairy Products Symposium**, at the Wyndham Milwaukee Center Hotel in Milwaukee. Guest speakers from around the world will address topics on the manufacture and development of yogurt products, frozen yogurt, nonfat cultured products, cottage cheese, and new probiotic cultures. For additional information, contact Lisa Lecher or Dr. Bill Watrous at Chr. Hansen, Inc., by phone at (800) 247-8321; fax (414) 476-2313.

• **20-24, InterChinapack 97, International Exhibition for Packaging Machines and Processing Equipment**, will take place at the China International Exhibition Center in Beijing, China. The Düsseldorf Trade Fair Company is renowned as the organizer of interpack, the world's largest trade fair for packaging machinery and materials and confectionery machinery. For further information, contact Düsseldorf Trade Shows, New York, 70 West 36th St., Suite 605, New York, NY 10018; telephone (800) 232-3914; (212) 356-0407; fax (212) 356-0420.

JULY

• **6-9, IAMFES Annual Meeting**, in Orlando, FL at the Hyatt Regency Grand Cypress Hotel. For additional information, call (800) 369-6337; (515) 276-3344; fax (515) 276-8655.

• **20-23, 9th Australian Food Microbiology Conference**, to be held in Sydney. All inquiries regarding submission of papers, registration, exhibition participation or sponsorship may be directed to the Conference Secretariat at GPO Box 2609, Sydney NSW 2001, phone (02) 241 1478; fax (02) 251 3552, e-mail: reply@icmsaust.com.au.

• **11-18, 17th International Workshop on Rapid Methods and Automation in Microbiology XVII**, in Manhattan, KS. A symposium will occur on July 11 and 12. Contact Daniel Y.C. Fung, telephone (913) 532-5654; fax (913) 532-5681; e-mail: DANFUNG@KSU.KSU.EDU.

IAMFES Offers the Dairy Practices Council "Guidelines for the Dairy Industry"

IAMFES has agreed with the Dairy Practice Council to distribute their "Guidelines for the Dairy Industry." DPC is a non-profit organization of education, industry and regulatory personnel concerned with milk quality and sanitation throughout the United States. In addition, its membership and subscriber rosters list individuals and organizations throughout the United States, Canada and other parts of the world.

For the past 26 years, DPC's primary mission has been the development and distribution of educational guidelines directed to proper and improved sanitation practices in the production, processing, and distribution of high quality fluid milk and manufactured dairy products.

The DPC Guidelines are written by professionals who comprise five permanent Task Forces. Prior to distribution, every Guideline is submitted for approval to the State Regulatory Agencies in each of the member states which are now active participants in the DPC process. Should any official have an exception to a section of a proposed guideline, that exception is noted in the final document.

The Guidelines are renowned for their common sense and useful approach to proper and improved sanitation practices. We think that they will be a valuable addition to your professional reading library.

The entire set consists of 54 guidelines including:

- | | |
|---|--|
| <ul style="list-style-type: none"> 1 Planning Dairy Freestall Barns 2 Effective Installation, Cleaning and Sanitizing of Milking Systems 3 Selected Personnel in Milk Sanitation 4 Installation, Cleaning, & Sanitizing of Large Parlor Milking Systems 5 Directory of Dairy Farm Building & Milking System Resource People 7 Sampling Fluid Milk 8 Good Manufacturing Practices for Dairy Processing Plants 9 Fundamentals of Cleaning and Sanitizing Farm Milk Handling Equipment 10 Fluid Milk Shelf-Life 11 Sediment Testing and Producing Clean Milk 13 Environmental Air Control & Quality for Dairy Food Plants 14 Clean Room Technology 16 Handling Dairy Products From Processing to Consumption 17 Causes of Added Water in Milk 18 Fieldperson's Guide to Troubleshooting High Somatic Cell Counts 21 Raw Milk Quality Tests 22 Control of Antibacterial Drugs and Growth Inhibitors in Milk and Milk Products 23 Preventing Rancid Flavors in Milk 24 Troubleshooting High Bacteria Counts of Raw Milk 25 Cleaning and Sanitizing Bulk Pickup and Transport Tankers 28 Troubleshooting Residual Films on Dairy Farm Milk Handling Equipment 29 Cleaning and Sanitizing in Fluid Milk Processing Plants 30 Potable Water on Dairy Farms 31 Composition and Nutritive Value of Dairy Products 32 Fat Test Variations in Raw Milk | <ul style="list-style-type: none"> 33 Brucellosis and Some Other Milkborne Diseases 34 Butterfat Determinations of Various Dairy Products 35 Dairy Plant Waste Management 36 Dairy Farm Inspection 37 Planning Dairy Stall Barns 38 Preventing Off-flavors in Milk 39 Grade A Fluid Milk Plant Inspection 40 Controlling Fluid Milk Volume and Fat Losses 41 Milkrooms and Bulk Tank Installation 42 Stray Voltage on Dairy Farms 43 Farm Tank Calibrating and Checking 44 Troubleshooting Dairy Barn Ventilation Systems 45 Gravity Flow Gutters for Manure Removal in Milking Barns 46 Dairy Odor Control 47 Naturally Ventilated Dairy Cattle Housing 48 Cooling Milk on the Farm 49 Postmilking Teat Dips 50 Farm Bulk Milk Collection Procedures 51 Controlling the Accuracy of Electronic Testing Instruments for Milk Components 52 Emergency Action Plan for Outbreak of Milkborne Illness in the Northeast 53 Vitamin Fortification of Fluid Milk Products 54 Selection and Construction of Herringbone Milking Parlors 56 Dairy Product Safety (Relating to Pathogenic Bacteria) 57 Dairy Plant Sanitation 58 Sizing Dairy Farm Water Heater Systems 59 Production and Regulation of Quality Dairy Goat Milk 60 Trouble Shooting Microbial Defects: Product Line Sampling & Hygiene Monitoring 63 Controlling the Quality & Use of Dairy Product Rework 65 Installing & Operating Milk Precoolers Properly on Dairy Farms |
|---|--|

If purchased individually, the entire set would cost \$219. We are offering the set, packaged in three loose leaf binders for \$125 plus \$9 shipping and handling (outside the U.S., \$21 for shipping and handling).

Information on how to receive new and updated Guidelines will be included with your order.

To purchase this important source of information, complete the order form below and mail or FAX (515-276-8655) to IAMFES.

Please enclose \$125 plus \$9 shipping and handling for each set of Guidelines. Shipments outside the U.S. are \$125 plus \$21 shipping and handling.

Payment in U.S. \$ drawn on a U.S. Bank or by credit card.

Name: _____ Phone No. _____

Company: _____

Street Address: _____

City, State/Province, Code: _____

VISA/MC/AE No.: _____

Exp. Date: _____

The International Association of Milk, Food and Environmental Sanitarians, Inc.

6200 Aurora Avenue, Suite 200W • Des Moines, Iowa 50322-2863 • (515) 276-3344 or (800) 369-6337



SHIP TO: (Please print or type. All areas must be completed in order to process.)

Name _____
 Job Title _____ Company Name _____
 Address _____
 City _____ State or Province _____
 Country _____ Zip/Postal Code _____
 Office Telephone # _____ FAX # _____

IAMFES Booklets

Quantity	Description	Member or Gov't. Price	Non-Member Price	Total
	Procedures to Investigate Waterborne Illness—2nd Edition	\$8.00	\$16.00	
	Procedures to Investigate Foodborne Illness—4th Edition	6.00	12.00	
	Procedures to Investigate Arthropod-borne and Rodent-borne Illness	6.00	12.00	
	Procedures to Implement the Hazard Analysis Critical Control Point System	6.00	12.00	
	Pocket Guide to Dairy Sanitation (minimum order of 10)	.50	.75	

Multiple copies available at reduced prices.
 Phone our order desk for pricing information on quantities of 25 or more.

Shipping/Handling (See Below)

Booklet Total

3-A Sanitary Standards

Quantity	Description	Member or Gov't. Price	Non-Member Price	Total
	Complete Set 3-A Dairy & Egg Standards	\$60.00	\$120.00	
	Five-year Update Service on 3-A Dairy & Egg Standards	80.00	160.00	

Shipping/Handling (See Below)

3-A Sanitary Standards Total

Total Order Amount

Mail order to the IAMFES address listed above, or
 call (515) 276-3344, (800) 369-6337 (U.S. and Canada);
 or fax your order to (515) 276-8655.

Method of Payment

CHECK OR MONEY ORDER ENCLOSED
 MASTERCARD VISA AMERICAN EXPRESS

Exp. Date _____

SIGNATURE _____

**PAYMENT MUST BE ENCLOSED FOR
 ORDER TO BE PROCESSED**

★ U.S. FUNDS ON U.S. BANK ★

Shipping and Handling

IAMFES booklets

Within U.S.
 First booklet \$2.00
 Each additional booklet \$1.00
 Pocket Guide to Dairy Sanitation—per 10 .. \$2.50

Outside U.S.
 First booklet \$4.00
 Each additional booklet \$1.00
 Pocket Guide to Dairy Sanitation—per 10 .. \$3.50

3-A Sanitary Standards

Within U.S. (each item) \$6.25
 Outside U.S. (each item) \$10.25

Prices effective through August 31, 1997



This is Your Personal Invitation to Join

The International Association of Milk, Food and Environmental Sanitarians, founded in 1911, is a non-profit educational association of food protection professionals. The IAMFES is dedicated to the education and service of its members, specifically, as well as industry personnel in general. Through membership in the Association, IAMFES members are able to keep informed of the latest scientific, technical and practical developments in food protection. IAMFES provides its members with an information network and forum for professional improvement through its two scientific journals, educational annual meeting and interaction with other food safety professionals.

Who are IAMFES Members?

The Association is comprised of a diverse membership of over 3,200 from 75 nations. IAMFES members belong to all facets of the food protection arena. The main groups of Association members fall into three categories: Industry Personnel, Government Officials and Academia.

Why are They IAMFES Members?

The diversity of its membership indicates that IAMFES has something to offer everyone involved in food protection and public health.

Your Benefits as an IAMFES Member

Dairy, Food and Environmental Sanitation — Published monthly, this is the official journal of IAMFES. Its purpose is the disseminating of current information of interest to the general IAMFES membership. Each issue contains three to five informational applied research or general interest articles, industry news and events, association news, columns on food safety and environmental hazards to health, a food and dairy industry related products section, and a calendar of upcoming meetings, seminars and workshops. All regular IAMFES members receive this publication as part of their membership.

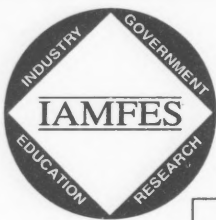
Journal of Food Protection — A refereed monthly publication of scientific research and authoritative review articles. Each issue contains 15 to 20 technical research manuscripts and one to five articles reporting a wide variety of microbiological research pertaining to food safety and quality. The *Journal of Food Protection* is internationally recognized as the leading publication in the food and dairy microbiology field. This journal is available to all individuals who request it with their membership.

The IAMFES Annual Meeting — Held in a different city each year, the IAMFES Annual Meeting is a unique educational event. Three days of technical sessions, scientific symposia and commercial exhibits provide members and other industry personnel with over 200 presentations on the most current topics in food protection. It offers the opportunity to discuss new technologies and innovations with leading authorities in various fields concerned with food safety. IAMFES members receive a substantially reduced registration fee.

To Find Out More...

To learn more about IAMFES and the many other benefits and opportunities available to you as a member, please call (515) 276-3344 or (800) 369-6337; fax (515) 276-8655.

"The mission of IAMFES is to provide food safety professionals worldwide with a forum to exchange information on protecting the food supply"



International Association of Milk, Food and Environmental Sanitarians

MEMBERSHIP

- Membership with JFP and DFES \$120.00
(12 issues of the *Journal of Food Protection and Dairy, Food and Environmental Sanitation*)

◀ **BEST VALUE**

- Membership with DFES \$75.00
(12 issues of *Dairy, Food and Environmental Sanitation*)

- Check here if you are interested in information on joining your state/province chapter of IAMFES

SUSTAINING MEMBERSHIP

- Membership with BOTH journals \$485.00
(Includes exhibit discount, Annual Meeting issue advertising discount, company monthly listing in both journals and more)

STUDENT MEMBERSHIP*

- Membership with JFP and DFES \$60.00
 Membership with *Journal of Food Protection* \$37.50
 Membership with *Dairy, Food and Environmental Sanitation* \$37.50

*FULL-TIME STUDENT VERIFICATION MUST ACCOMPANY THIS FORM

Shipping Charges: Outside U.S. _____ Surface (\$22.50 per journal) _____ AIRMAIL (\$95.00 per journal)

PLEASE TYPE...ALL AREAS MUST BE COMPLETED FOR ORDER TO BE PROCESSED

Name _____
First Name M.I. Last Name

Company Name _____ Job Title _____

Address _____

City _____ State or Province _____

Country _____ Postal/Zip +4 _____

Office Telephone # _____ Fax # _____

e-mail # _____

U.S. FUNDS on U.S. BANK

Method of Payment

Membership: _____ New _____ Renewal

CHECK OR MONEY ORDER ENCLOSED

MASTERCARD VISA AMERICAN EXPRESS

Mail Entire Form to:

IAMFES
6200 Aurora Ave, Suite 200W
Des Moines, IA 50322-2863

OR Use Your Charge Card:

(800) 369-6337 (U.S. & Canada)
(515) 276-3344
(515) 276-8655 FAX

Exp. Date _____

SIGNATURE _____

MEMBERSHIP APPLICATION

Prices effective through August 31, 1997



**This
publication is
available in
microform.**

University Microfilms International reproduces this publication in microform: microfiche and 16mm or 35mm film. For information about this publication or any of the more than 13,000 titles we offer, complete and mail the coupon to: University Microfilms International, 300 N. Zeeb Road, Ann Arbor, MI 48106. Call us toll-free for an immediate response: 800-521-3044. Or call collect in Michigan, Alaska and Hawaii: 313-761-4700.

**University
Microfilms
International**

Please send information about these titles:

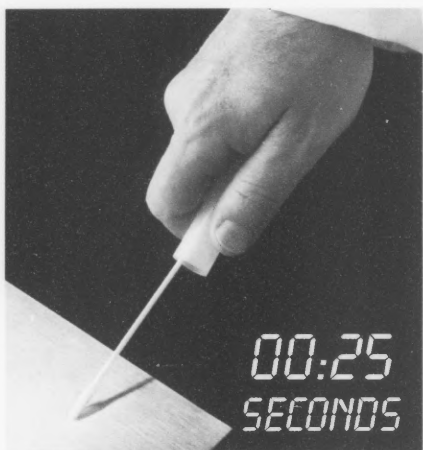
Name _____

Company/Institution _____

Address _____

City _____ State _____ Zip _____

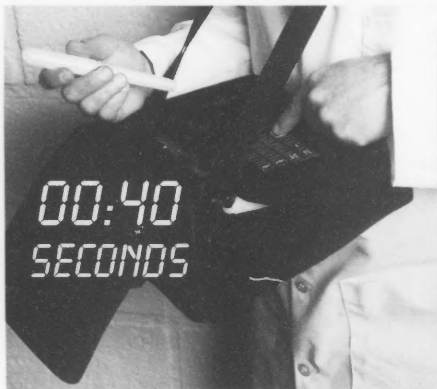
Phone () _____



SWAB



TWIST



COUNT

PocketSwab™

*Pre-op Monitoring of
Sanitation Effectiveness
has never been
Easier or Faster*

- Single Service ATP Hygiene Swab
- *Fastest and Most Sensitive*
- Room Temperature Stable
- No Glass No Tools
- Option to Collect and Hold up to Six Hours
- Reclean and Retest Suspect Areas Faster

SECONDS COUNT.

Call Now.
800 343-2170
617 322-1523

CHARM SCIENCES INC.

36 FRANKLIN STREET MALDEN MA 02148 USA
617 322-1523 FAX 617 322-3141

Nothing works like a Charm.

