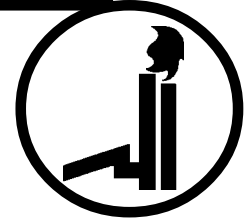


Dairy Products Manufacturing Workers



Occupational Brief Title Codes:

- D.O.T.: 529
- G.O.E.: 06.02.10
- S.O.C.: 51-
- O*NET™ 3.1: 51-
- N.A.I.C.S.: 3115
- H.O.C.: No Code

Occupational Subtitles:

- Bottling Operators
- Buttermakers
- Cheesemakers
- Dairy Field Supervisors
- Dairy Helpers
- Dairy Processing Equipment Operators
- Plant Supervisors
- Quality Control Technicians
- Sanitarians

Work Classification Based Related

D.O.T. Occupations:

- Candy Makers
- Egg Pasteurizer
- Hydrogenation Operators
- Weigh-Tank Operators

Interests Based Related

G.O.E. Occupations:

- Bakers
- Center-Machine Operators
- Drier Operators
- Extruder Operators

Skills Based Related

O*NET Occupations:

- Conveyor Operators and Tenders
- Embossing Machine Set-Up Operators
- Gas Compressor Operators

Noteworthy Quote:

"Dairy is one of nature's perfect foods and careers in this exciting category provide rewarding returns and challenges, as almost everyone enjoys products made from milk. Ice cream, cheese, yogurt, and milk are just a few of the great tasting dairy foods consumers love."

James J. Page, CEO
American Dairy Products Institute

Dairy products manufacturing workers ('dairy 'prod-ucts man-u 'fac-tur-ing 'work-ers) set up and operate continuous-flow or vat equipment to process milk and make milk products such as cheese, butter, yogurt, ice cream, and other dairy products.

Most Americans have seen the national *Got Milk?* advertising campaign. It stresses the importance of milk and other dairy products in the daily diet. Dairy products are divided into four classifications. Class I includes all fluid milk products such as milk for drinking, cream, skim milk, and lowfat milks. Class II includes all manufactured products such as yogurt, cottage cheese, and ice cream. Class III includes all cheeses and class IV includes butters and powdered dairy products. Dairy products manufacturing workers control the processes that transform milk into dairy products.

Work Performed

Milk plants process milk and manufacture milk products. Most plants are automated and computer controlled. The most important element of this industry is the requirement that every piece of equipment be properly designed and constructed, and kept clean and free from contamination. From start to finish, processes center on keeping the milk free of disease-causing bacteria. The principal means of protecting the products is temperature. Low temperatures stop bacterial activity. High temperatures kill most bacteria. Pasteurization kills bacteria and reduces spoilage.

Plant supervisors oversee the handling of the milk that comes into the plant and the products that go to the market. They direct plant workers, make sure staff keep accurate records, maintain quality control, and ensure adherence to sanitation standards.



Dairy products manufacturing workers set up and operate equipment to process milk and make milk products such as cheese, butter, yogurt, ice cream, and other dairy products.

Photo by Amy Elliott

Dairy products undergo many tests and inspections performed by **quality control technicians**. These workers test for bacterial counts; for percentages of milk fat, nonfat milk solids, and water; for odor, acidity, flavor, and color; and for absence from adulteration. They also test regularly for protein content. Tests on raw milk detect pesticide and antibiotic traces, or reveal signs of mastitis in the cows that give the milk. These tests are required to insure that products meet rigid state and federal standards.

Dairy field supervisors work with dairy farmers to ensure that dairy plants have good sources of fresh milk. They may help milk producers improve their methods and their herds. They give farmers advice on how to improve milk quality. They offer tips on the feeding and care of the cows and outline sanitary procedures. They are responsible for seeing that farmers adhere to strict sanitary standards on farms.

Whole milk arrives at the plant in large stainless steel tankers holding 6,000 to 7,000 gallons of milk. The milk is stored in large silos holding about 25,000 gallons. It is maintained below 40 degrees Fahrenheit before and after processing.

Since consumers have developed a preference for low-fat milk, separation of fat is the first step at dairy plants.

Dairy processing equipment operators connect the silos holding the milk to the processing equipment. They assemble pipes, valves, bowls, plates, disk, impeller shaft, and whatever else is required. They turn valves to pump the whole milk into large electrically powered centrifuges, which separate the fat from the fluid to produce whole milk, low-fat milk, and skim milk. The milk also goes through a homogenizer, which distributes the fat evenly through the milk, and a filter to remove any sediment.

Pasteurizer operators tend equipment that heats the milk to the minimum time and temperature required to destroy any harmful bacteria present in the milk.

At this stage, operators may then add measured amounts of ingredients such as chocolate, neutralizers, lactic culture, calcium, vitamins, or stabilizers to make products such as buttermilk, chocolate milk, or ice cream mix.

Bottling operators in fluid milk plants follow sanitary methods and maintain the correct temperatures in the packaging of milk products in contamination-free plastic, glass, paper, or composite containers.

Dry milk operators pasteurize and condense skim milk, and remove water, converting the milk into a dry, shelf-stable product. They control the temperature and the time in the heating and drying process. Most plants use the spray-drying method. Condensed milk sprayed into a heated stainless steel chamber is dried instantly. Operators are careful to prevent the scorching of the dry milk and to get the correct moisture content, which insures quality and prevents caking during storage.

Sour cream and buttermilk processing operators process bacterial cultures that convert lactose (milk sugar) to lactic acid. They add precise amounts of a bacterial culture in order to develop the proper flavor. Careful

control of fermentation allows the bacterial action that gives the products the thickness and flavor the public prefers.

Ice cream mix processing operators mix milkfat, nonfat solids, sweeteners, and other ingredients so that the products meet standards for fat, milk solids, and bacterial count. The mix is pasteurized before freezing. These workers also oversee the ice cream freezing to insure the correct overrun (increase in volume) and a smooth texture.

Butter production is another branch of dairy products manufacturing. **Buttermakers** pump measured amounts of pasteurized cream into the churn. They start the churn and observe the separation of the butter from the buttermilk. They pump out and store the buttermilk, and spray the butter with chlorinated water to remove excess buttermilk. They test the butter for salt and moisture content, and grade it for flavor. They control the fat content of the butter according to legal requirements.

The dairy industry produces many kinds of cheeses, but most plants make only one or two kinds. Cheeses come under the headings of hard, soft, and pasteurized process cheese. Hard cheeses include Cheddar and Swiss cheese. Soft cheeses include cream cheese, cottage cheese, and baker's cheese. Other soft cheeses that require aging or curing are Brie and Camembert. Pasteurized process cheese is made by blending (under heat and with an emulsifying agent) one or more natural cheeses, such as cheddar cheese, into a uniform mass. It is packaged in a broad range of forms.

Cheesemakers pasteurize milk, set milk with bacterial culture and rennet (an enzyme derived from animal sources), cut and cook curd, and drain off whey. To make hard cheeses, they put the curd in bulk packages, which then undergo pressing and curing or aging before release to the market. Cheesemakers combine art with science in using bacterial cultures and temperatures. They control inhibitors such as bacteriophages and bacterial viruses. They control the temperature of the mixture at each step in the cheesemaking and curing process.

Dairy helpers do odd jobs to help operators. They dismantle and scrub pipes, fittings, and machines. They reattach pipes and fittings to machines. They examine milk and receive it into large bulk tanks. They put milk, cream, butter, cheese, and dry milk into machines, and start and stop the machines. In the butter department they operate machines that cut butter and wrap it in foil or paper, and pack it in bulk cartons.

Dairy helpers fill bags or cartons with dry milk and weigh them on a scale. Using a hand truck they take bottles, cartons, and packages to storage. They put empty bottles, cases, and cans on conveyors that take them to washing or filling stations although plastic containers are most commonly used now.

Sanitarians are in charge of sanitation programs in dairy products plants. They inspect products and machines to see that they meet sanitation laws and standards

of cleanliness. They direct handlers and production workers in sanitary procedures and pest control measures.

These workers inspect the plant to insure sanitary practices are being followed, and to oversee the cleaning of machines and work stations. In the raw milk receiving department sanitarians examine shipments for undesirable substances. They take samples of milk for laboratory testing and evaluation. To improve the purity of dairy products, they may recommend changes in equipment, lighting, ventilation, or production procedures.

Many small plants have only a few employees who may do three, four, or more jobs. In large plants each worker may have a special task, which is only one step of a process or operation.

Working Conditions

Because of the strict health codes and sanitary standards they must meet, dairy plants are usually clean, well-ventilated, and equipped with modern machines. Most plant employees stand while they work. The milk is usually transported from tank to tank through pipes, but workers may have to lift and carry boxes of flavoring, food additives, and finished products such as cheese. Some of the work is repetitive. Many work stations require strict observance of precise procedures and schedules.

This industry has few dangers other than those that go with the operating of machines such as bottling machines, washers, and pasteurizing equipment. In cleaning vats workers may deal with hot water and live steam. Some areas may be moist or humid at times. Workers in cold-storage departments wear warm clothing.

Hours and Earnings

Workers in dairy plants usually work a five-day, forty-hour week. Often, work begins at 6:00 a.m. and continues to 2:30 or 3:00 p.m. The installation of bulk milk tanks on dairy farms permits milk collection every other day instead of daily. Large plants may have two or more shifts. Some plants work around the clock.

According to a report from the Bureau of Labor Statistics, in the year 2000, the average hourly rate for production workers in the dairy products industry was \$14.04 an hour. Wages ranged from a high of more than \$21.45 an hour to a low of less than \$8.39 an hour. Earnings vary depending on geographic location, employer, and years of experience.

Fringe benefits in the dairy products manufacturing industry are good. Employees get paid vacations that range from one to five weeks. They also get paid holidays. Most plants have health and hospital insurance as well as pension plans. Union contracts, in general, negotiate wages, pensions, health benefits, and paid leave such as sick time and vacations.

Education and Training

Unskilled workers in these plants should have a high school diploma. High school courses useful in this work

are mathematics, biology, and chemistry. Machine shop courses can also be useful. New workers learn the details of the job from operators. As they acquire skill and practice they get their own job assignments. Skilled workers usually have a technical school or college background with studies in dairy science, food science, microbiology, agriculture, or business.

Licensing, Certification, Unions and Professional Societies

Many dairy production workers do not belong to a union. Some production workers and milk truck drivers are members of the International Brotherhood of Teamsters. A smaller number of workers are in the United Food and Commercial Workers International Union.

Because of the importance of consumer safety, all segments of the industry—from farmer to retailer—are subject to inspection and regulation. All dairy products manufacturing plants are inspected and approved for operation either by a state board of health or by a local government unit. Licenses help guarantee that workers understand and follow health laws in handling equipment and are capable of grading the quality of the products. Laboratory technicians and cheese graders may need to be licensed as well.

Personal Qualifications

Production workers in dairy products manufacturing must be able to work at a fast pace. They should be careful and meticulous workers who pay strict attention to details. They must be accurate and dependable. They must be able to tolerate routine work.

Supervisors must have leadership skills, be able to get along well with people, and be able to maintain morale among the workers. They must be able to keep accurate records.

Occupations can be adapted for workers with disabilities. Persons should contact their school or employment counselors, their state office of vocational rehabilitation, or their state department of labor to explore fully their individual needs and requirements as well as the requirements of the occupation.

Where Employed

Dairy plants operate nationwide. States with the most dairy farms are in the Northeast, the Great Lakes, the Corn Belt, the Appalachian region, and the Southern Plains region. California and Washington also have many dairy farms. Dairy processing plants are usually near dairy farms to keep transportation costs down and to ensure the quality and freshness of the milk. However, the Southeast and Southwest are deficient in milk production. Milk from states high in production is often transported to these regions. Many dairy plants are operated by dairy cooperatives. Cooperatives are enterprises owned by farmers who together use the dairy plants to process and market their milk.

Employment Outlook

The consumption of milk and dairy products in the United States remains high. Cheeses, low-fat milk, and ice

cream have grown in demand. An international market for dairy products also keeps the demand high.

Offsetting this demand, however, are improvements in technology and automation, which are replacing workers. Therefore, the number of workers is expected to decline through 2010.

Employment in this industry is steady, because it is not subject to the sharp ups and downs of heavy industry. The demand for trained technicians and supervisors is expected to remain steady.

Entry Methods

High school graduates can apply to local dairy plants for work. Want ads in local newspapers sometimes list job openings. State employment offices also have job leads. Graduates of technical schools, and two-year and four-year colleges can apply to the personnel managers of these plants. Campuses with dairy manufacturing and dairy product technology majors often conduct campus recruitment for personnel managers from dairies. They can also get help in their job search from their school placement office.

Advancement

The size and the policies of employing plants determine the advancement prospects of the workers. In many small plants advancement beyond a position as supervisor is limited. Supervisors with interest and initiative, and who continue their education, may advance by moving from company to company.

For Further Research

American Dairy Products Institute, 116 N. York Street, Elmhurst, IL 60126. Web Site: www.adpi.org

CAB International North America, 2001 Evans Road, Cary, NC 27513.

Milk Composition, Production, and Biotechnology. R.A.S. Welch, D.J.W. Burns, and S.R. Davis (Editors). \$120.00 hardbound.

Iowa State University Press, 2121 South State Avenue, Ames, IA 50014-8300.

Marketing and Pricing of Milk and Dairy Products in the United States. Kenneth W. Bailey. \$39.95 hardbound.

Westview Press, 5500 Central Avenue, Boulder, CO 80301-2877.

The Potential Effect of Two Biotechnologies on the World Dairy Industry. 150 pages. \$69.00 hardbound.

Acknowledgments

Chronicle Guidance Publications appreciates the cooperation of the following who reviewed the information in this brief.

James J. Page, Chief Executive Officer, American Dairy Products Institute, 116 N. York Street, Elmhurst, IL 60126.

O*NET™ 3.1 is a trademark of the U.S. Department of Labor, Employment and Training Administration.

H.O.C. codes adapted and reproduced by special permission of the publisher, Psychological Assessment Resources, Inc., Odessa, FL 33556, from the *Dictionary of Holland Occupational Codes-Third Edition*, by Gary D. Gottfredson, Ph.D., and John L. Holland, Ph.D. Copyright 1982, 1989, 1996 by PAR, Inc.

Briefs Related to This Title

Bakery Products Workers. **Brief 410.**

Brewery Workers. **Brief 631.**

Canning and Preserving Industry Workers. **Brief 389.**

Confectionery Industry Workers. **Brief 357.**

Pasta Products Workers. **Brief 555.**

Slaughtering and Meat-Packing Production Workers. **Brief 423.**

Tobacco Products Industry Workers. **Brief 327.**

Winery Workers. **Brief 613.**

For a complete list of brief and reprint titles with current pricing information call:

Chronicle Guidance Publications, Inc.

66 Aurora Street
Moravia, New York 13118-3576
Phone 1 800 622-7284 FAX (315) 497-3359
Visit our Web Site at
www.ChronicleGuidance.com