

# dairy processing plants

Plant Construction,  
Equipment and  
Operation Standards

*To Qualify for Licensing in British Columbia*



BC Centre for Disease Control

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# Dairy Processing Plants

## A. Dairy Plant Licensing

An issue of interest to all consumers is the safety and wholesomeness of dairy products. The dairy industry is highly regulated from the origin of milk at dairy farms through to the retail markets where consumers ultimately purchase the products.

The ***Milk Industry Act and Regulation*** require that dairy products be produced in dairy plants that conform to the provisions of the legislation including being in possession of a valid operating licence. The Act and Regulation also specify standards for construction and equipment, dairy product quality including strict microbiological and chemical controls, dairy plant worker certification, pasteurization requirements and other operational standards.

In addition to the *British Columbia Milk Industry Act*, other legislation may also apply to dairy plants depending on the nature and destination of their products. Applicants are encouraged to contact the following agencies to ensure they are aware of other legislation that may impact on their operations:

- Canadian Food Inspection Agency
- British Columbia Ministry of Agriculture, Fisheries & Food
- British Columbia Milk Board
- Local Health Authority Service Area

The British Columbia Ministry of Agriculture, Fisheries and Food is responsible for raw milk production through the licensing and inspection of dairy farms and tank receivers. Food Protection Services, BC Centre for Disease Control is responsible for the licensing and inspection of all dairy plants in British Columbia. Dairy Plant Specialists conduct an integrated program of construction approval, inspection, education and enforcement to ensure the safe operation of dairy plants.

Federal registration by the CFIA is required for dairy plants that export their products either inter-provincially or internationally. The provincial and federal agencies conduct a coordinated inspection program for plants in this category. Dairy plants which only ship their products intra-provincially may, in addition, apply for federal certification on a voluntary basis. Applicants are encouraged to contact the CFIA for further details on their program.

Information and standards discussed in this manual deal exclusively with requirements to qualify for licensing under the *British Columbia Milk Industry Act*.

## B. Raw Milk Supply

The BC Milk Marketing Board (BCMMB) regulates milk production in British Columbia. The Board represents producers, processors and other stakeholders, and is comprised of four elected members and one member appointed by the Milk Industry Advisory Committee.

The BCMMB allots milk quota to producers for the purpose of ensuring adequate amounts of production to meet consumer needs. The Board also licences producers, processors and transporters, and establishes the prices that processors pay for the use of milk in each class.

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Processors convert raw milk into five classes of products. Class 1 or fluid milk products include homogenized milk, partly skimmed milk, skim milk, cream, whipping cream, buttermilk, eggnog and chocolate milk. Class 2 milk products include sour cream, yogurt, puddings, ice cream and other frozen dairy products. Class 3 milk products include all cheeses, whereas Class 4 milk products include butter, milk powder, condensed milk and evaporated milk. Classes 2 to 4 are collectively known as industrial milk classes. Class 5 or Special Class milk products include dairy products used for further processing in Canada and some products for export out of Canada.

Prospective dairy plant operators are advised to contact the BCMMB regarding licensing requirements and raw milk deliveries. Special Class permits must be obtained from the Canadian Dairy Commission prior to the manufacture of Class 5 milk products.

### C. Dairy Product Labelling Requirements

Dairy products must be properly labelled to identify the nature of the product, volume, ingredients and butterfat concentrations. Plants must obtain packaging approval from the CFIA. The label and package must not be misleading, deceptive or give an erroneous impression regarding the dairy product character, quantity or composition. Any product that is mislabelled is subject to recall by the regulatory agencies.

### D. Dairy Plant Workers

Modern dairy plant processes require that dairy plant personnel have a satisfactory level of competency in order to operate and maintain equipment in a safe and sanitary manner. To this end, any person involved in the receiving, processing, manufacturing, packaging, cleaning or sanitizing or other duties related to the production of dairy products may work in a dairy plant only if licenced as a dairy plant worker by Food Protection Services, BCCDC. In order to qualify for a dairy worker licence, an individual must hold a certificate confirming the satisfactory completion of a recognized dairy course.

### E. Sampling & Testing of Dairy Products

Dairy products are nutrient rich food products, which, if improperly processed, are capable of transmitting disease organisms to consumers. Tests routinely conducted on finished dairy products include:

- bacteria (standard plate count and coliform)
- inhibitors
- added water
- phosphatase

Dairy plants are encouraged to operate their own laboratory based quality control program wherever financially feasible.

The *Milk Industry Standards Regulations* require, as a minimum standard, that dairy plants submit samples of all types of their dairy products to a government designated laboratory at least once per month. Sample results are forwarded to the Dairy Plant Specialists for evaluation and ensurance that dairy products offered for sale in British Columbia are safe and wholesome. Costs for shipping and analyses of these samples are borne by the dairy plant.

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### F. Planning & Locating a Dairy Plant

#### ***Site and Location***

Prior to site selection, plan development and plant construction it is essential that all regulatory requirements of municipal, provincial and federal governments are known. In many instances the initial action will be assuring that land use and zoning requirements are recognized. It is important that land use conflicts or potential conflicts be recognized and addressed at the outset. Also of importance is early consideration to proposed means of water supply and waste disposal. This is of particular concern where municipal services are not available.

**NOTE:** Since there are specific technical considerations with respect to selection, design, construction, equipment and operation of dairy plants it is highly recommended that applicants retain the services of consultants knowledgeable in the design of dairy plants and dairy plant equipment.

#### ***Application for Approval***

Application for approval should be made to:

Dairy Plant Specialist  
Food Protection Services  
BC Centre for Disease Control  
655 12<sup>th</sup> Ave W  
Vancouver BC V5Z 4R4  
Telephone: (604) 660-5357

#### ***Plan Submissions***

Three copies of plans containing the following detail must be submitted:

- a) A site plan showing the property boundaries, location of all buildings, access roadways, fences and ancillary structures and separation distances from other industrial, commercial and residential buildings.
- b) A building plan showing cross sections of the plant, floor plan of each level, the purpose for which each room is intended, location of walls, partitions, windows, doors, posts, conveyors and all equipment. The floor plan must indicate location of floor drains, potable water and sewer lines, and plumbing fixtures including hand sinks and slope of floors to drains.

The plans as submitted must also include the following information:

- scale used in the drawings,
- cardinal points of the compass,
- details of the sewage disposal system if other than a municipal sewer,
- ventilation system used in the plant,
- a finishing schedule for all floors, walls and ceilings,
- the source of water and a current chemical and microbiological analyses. Where a well is proposed for use the location must be noted on the site plan,
- details and location of the lighting system,
- engineered drawings of all pasteurization systems,
- location and details of CIP equipment,
- other information as required depending on the nature and complexity of the proposed operation.

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## G. Plant Construction Standards

National guidelines for the construction and operation of dairy processing plants are available at [http://www.cfis.agr.ca/english/regcode/codes\\_tbl\\_e.shtml](http://www.cfis.agr.ca/english/regcode/codes_tbl_e.shtml) . Follow the appropriate links listed under “National Dairy Regulations and Code (NDRC)” and “Interpretive Guidelines for the Processing Sector”. For your convenience, key requirements are listed below:

### ***Floors***

Floor construction is a crucial component of a properly designed dairy plant and should be designed to eliminate future problems. The floors of all rooms in which dairy products are processed, pasteurized, manufactured or stored must be constructed of sealed concrete or other impervious material with a smooth surface and sloped 1/4 inch per foot to adequately trapped drains. The floor /wall joints are to be coved for ease of cleaning and maintenance.

### ***Walls and Ceilings***

Walls and ceiling of rooms in which dairy products are processed, pasteurized, manufactured, packaged or stored shall be smooth, light coloured and impervious to moisture.

### ***Drains***

Properly trapped and covered floor drains with removable covers are essential in all areas of the plant. The drains must be of an adequate size and be kept clean.

### ***Overhead Utility Lines***

All overhead utility lines should be installed in such a manner as to avoid contamination of products below. They should be insulated where necessary and be designed and finished to prevent the accumulation of dirt and minimize condensation, mould development and flaking. They must be easy to clean.

### ***Lighting***

All plants shall provide adequate lighting, which is shielded with shatterproof coverings to ensure clean and efficient plant operation.

### ***Ventilation***

Adequate ventilation is required in all plants to prevent excessive heat, dust accumulation, odours or condensation and to provide a proper work environment for employees. The direction of airflow should be from the processing area outward to other areas of the plant.

### ***Dry Storage Area***

A separate dry storage area shall be provided in all dairy plants. Since the size requirements will depend on the needs of individual plants, this item will require site specific consideration. The intent and purpose of the room will be to provide protected storage for supplies and equipment not in immediate use.

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### ***Water Supply***

Complete details on the water supply. The source and proposed treatment (when necessary) must be described. Professionally engineered water systems may be required depending on source and type of dairy products being processed. An adequate supply of hot and cold water under pressure shall be provided in all plants. The operator must assure that the water is bacteriologically and chemically safe.

**NOTE:** Adequacy of the water supply will be determined on a site-specific basis and related to maximum production volumes. The responsibility for water quality analysis rests with the applicant. Consult the local health unit for types of tests required. Results of bacteriological and chemical analyses must be submitted for local health unit assessment prior to issuance of final approval to operate.

### ***Sewage Disposal Systems***

Sewage disposal facilities (either municipal or private systems) must be provided at all dairy plants. These systems are subject to provincial and municipal requirements. Consult the local health unit for required approvals.

### ***Refrigeration***

Refrigerated storage facilities must be provided for all dairy products. Temperature requirements for coolers and raw milk storage tanks shall be 4°C (40°F) or less but above 0°C (32°F); for freezers less than -18°C (0°F).

### ***Equipment***

Equipment used in the receiving, processing, pasteurizing, manufacturing, packaging, storing, dispensing, transporting or marketing of a dairy product shall be of an approved type or where applicable be based on 3A Standards. The equipment must not be defective, unsuitable or unsanitary.

### ***Staff Facilities***

Employee's facilities shall include a suitably designed dressing room and lunchroom. Conveniently located sanitary toilets for male and female employees shall be provided exclusively for the use of dairy plant personnel and shall not open directly into an area used for the processing or packaging of dairy products.

### ***Hand Washing Facilities***

Adequate and conveniently located facilities for hand washing and drying must be provided wherever the process demands. Where appropriate, facilities for hand disinfection should also be provided.

## **H. General Dairy Plant Operating Practices**

The following minimum operating procedures must be followed in all dairy plants:

1. Refuse shall not be permitted to accumulate in a plant or in or near the premises of a plant.
2. Passageways in a plant shall be kept clean and unobstructed. Rooms shall be kept clean and free of materials and equipment not related to plant operation.

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3. No milk shall be stored after receipt at a dairy plant for longer than two (2) hours before pasteurizing unless it is constantly held at a temperature of 4°C or less.
4. All equipment, including CIP lines, used in the processing, manufacturing, or packaging of dairy products shall be designed, installed and operated so as to insure that there is no possibility of cross contamination between pasteurized dairy products, unpasteurized dairy products, chemicals, water or wastes.
5. An efficient and adequate pest control program shall be maintained at all times in the dairy plant.
6. Dairy plants may not be used for a purpose other than the receiving; processing; manufacturing; pasteurizing; packaging; storing or selling of dairy products and related operations.
7. Every person shall hygienically cover their hair, including beards, when in the processing and packaging areas and wear hygienic hand coverings when in contact with dairy products or dairy product contact surfaces. Further, they shall change their boots and don clean outer garments before entering the processing and packaging area.
8. No person known or suspected to be suffering from or to be a carrier of a communicable disease is permitted to be actively employed at a dairy plant.
9. Dairy plants should be designed so that public access can be controlled and to prevent unauthorized entry to dairy processing areas.
10. All dairy products that are to be sold or supplied for feed for livestock or for other similar purposes shall at all times be handled, treated, processed and stored away from milk products intended for human consumption.
11. The accuracy of all thermometers used for pasteurization shall be within 0.5°C (1°F).
12. A retail outlet may be operated in conjunction with a dairy plant. Consult with the local Environmental Health Officer regarding compliance with the regulations governing the sanitation and operation of food premises.
13. Nothing may be added to a dairy product that has been pasteurized except ingredients that are microbiologically safe.
14. Plant records are to be provided and maintained on the following:
  - a) pasteurization charts
  - b) manufacturing records
  - c) sanitation records
  - d) microbiological records
  - e) lot identification
15. All packaging materials must be stored in a clean and sanitary manner. Only packaging material required for immediate use should be kept in the packing or filling area.
16. Establishment of a procedure to permit the complete, rapid recall of any contaminated lot of a dairy product.

## **Dairy Processing Plants**

### **I. General Pasteurization Requirements**

All equipment used in the pasteurization process must be approved and comply where appropriate with 3A Standards criteria for design, operation and installation.

### **J. Cleaning and Sanitation**

A cleaning and sanitizing program must be established to ensure that the processing equipment is capable of achieving and maintaining acceptable levels of sanitation. In addition, it is the responsibility of the dairy plant licensee to be knowledgeable of equipment manufacturer's recommended maintenance requirements and procedures.

A flow diagram of the entire system should be established and maintained to identify the critical factors of temperature, time, pressures, flow patterns and chemical concentrations.

Only approved food grade chemicals may be used in the cleaning program.

All cleaning chemicals must be stored safely in a controlled area away from milk products, ingredients and food storage containers.