

# Permits and Licenses Required *for startup of* Artisan Cheese Plants in Oregon



## Contents

<b>Steps involved in startup of an artisan cheese plant in Oregon</b> .....	2
<b>Preliminary steps</b> .....	2
<b>Permits</b> .....	3
Zoning permit .....	3
Waste water discharge permit .....	4
Building or structural permit.....	5
Water use permit and water right .....	6
<b>Licenses</b> .....	8
Dairy product plant license .....	8
Vat pasteurizer operator’s license .....	9
HTST pasteurizer operator’s license .....	10
Milk sampler/grader license.....	10
Scale license.....	10
<b>Approval of cheese label</b> .....	11
<b>Planning and business registration</b> .....	11
<b>Appendix I. Relevant Skills and Knowledge</b> .....	13
<b>Appendix II. Resources for the Artisanal/Farmstead Cheese Maker</b> .....	15
<b>Appendix III. License Fee Structure</b> .....	18
<b>Appendix IV. References</b> .....	19
<b>Appendix V. Glossary</b> .....	20
<b>Appendix VI. ODA Study Materials</b> .....	21

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# Permits and Licenses Required *for startup of* Artisan Cheese Plants in Oregon

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This publication is primarily intended for entrepreneurs who wish to start a new artisan cheese business and for dairy farm owners seeking new business opportunities for profitable use of milk.

This guide outlines and describes the key steps involved in starting an artisan cheese plant in Oregon. These steps primarily involve obtaining approvals, permits, and licenses from various agencies. In explaining these steps, the guide provides general information about relevant laws and regulations.

This guide does not cover legal requirements for starting a grade A dairy farm (e.g., CAFO or dairy fluid milk producer's license). This guide is not to be used as a source of legal advice. Contact the agencies listed in this publication if you have specific questions about laws and regulations. While an effort has been made to identify all pertinent Oregon laws and regulations effective in 2008, new or revised laws may be passed.

The guide contains the following sections:

- A flowchart of the key steps involved in the startup of a cheese plant (page 2)
- Preliminary steps for starting up an artisan cheese plant (pages 2–3)
- Procedures involved in obtaining zoning permits, waste water permits, building permits, and water usage permits (pages 3–8)
- Information about dairy product plant licenses, pasteurizer's licenses, milk sampler's licenses, and scale licenses (pages 8–11)
- Information about planning and business registration (pages 11–12)
- Appendix I—skills, knowledge, and preparatory steps to take prior to registering an artisan cheese business in Oregon (pages 13–14)
- Appendix II—resources for the farmstead/artisanal cheese producer (pages 15–17)
- Appendix III—license fee structures (page 18)
- Appendix IV—references (page 19)
- Appendix V—glossary (page 20)
- Appendix VI—study materials for ODA licenses (page 21 and following)



*There are many steps from milk to finished cheese, but perhaps just as many to start your business. Be sure to obtain all of the necessary permits and licenses before beginning cheese production.*

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## Preliminary steps

### Milk sources

Milk is the most important raw material for cheese manufacture. Most artisan cheese makers are farmstead operations, which means they manage and milk their own herd of cows, goats, or sheep. Thus, milk for cheese making is produced on the farm.

Non-farmstead artisan cheese makers must purchase milk. Milk can be purchased only from dairies that meet Grade A requirements of the Pasteurized Milk Ordinance (PMO) and are licensed and inspected by the Oregon Department of Agriculture (ODA) Food Safety Division. The ODA Food Safety Division website has a search feature to help you find a list of licensed milk producers in Oregon (<http://www.oda.state.or.us/dbs/licenses/search.lasso?&division=fsd>). Note that availability of milk from outside sources may be limited due to exclusivity contracts between dairy farmers and cooperatives/creameries.

Milk can be transported only by licensed milk haulers. Various designs of tanker trucks are available. For example, a flatbed trailer with a bulk tank attached can be used if approved by ODA. Although trailers typically are not refrigerated, they must be insulated to assure that the milk arrives at the plant at or below 45°F. We highly recommend contacting the ODA Food Safety Division before purchasing a trailer.

ODA requires all dairy plants to screen all bulk milk for beta-lactam antibiotic residues prior to processing, using an approved testing facility. Milk cannot be unloaded from the trailer until the test demonstrates no detectable beta-lactam residue. The person responsible for receiving the milk and taking raw milk samples for regulatory analysis must have a sampler/grader license. See page 10 for more information about this license.

For further details about milk testing requirements, see appendix N of the PMO (<http://www.fda.gov/Food/FoodSafety/Product-SpecificInformation/MilkSafety/NationalConferenceonInterstateMilkShipmentsNCIMSModelDocuments/PasteurizedMilkOrdinance2007/default.htm>) or contact ODA lab services at 503-872-6633.

### Raw fluid milk

The ODA Food Safety Division website ([http://www.oregon.gov/ODA/FSD/program\\_dairy.shtml](http://www.oregon.gov/ODA/FSD/program_dairy.shtml)) states that “A person may not sell or distribute for sale unpasteurized milk or fluid milk from cows, or dairy products from unpasteurized milk or fluid milk from cows, other than to a distributor, producer-distributor, dairy products plant licensee or nonprocessing cooperative.

## Steps involved in startup of an artisan cheese plant in Oregon

Select a plant site/building (page 3).

Identify water resources (page 7).

Identify milk sources (page 2).

Contact the county's Planning Division; check for zoning of the property and obtain zoning permit (page 3).

Obtain waste water discharge permit (page 4).

Notify ODA Food Safety Division about the business proposal (page 8).

Prepare blueprint of the plant and line up a builder.  
Select appropriate equipment.

ODA inspector approves building plan and equipment compatibility.  
Obtain building permit (page 5).

Construct building and install equipment.

Obtain water use permit and water right (page 6).

ODA Food Safety Division inspects site and issues plant license (page 8).

Obtain pasteurizer's license, milk sampler's license, and scale license (page 10).

Obtain approval of label by ODA Food Safety Division (page 11).

“The dairy law exempts from licensing a person owning not more than three dairy cows that have calved at least once, nine sheep that have lactated at least once or nine goats that have lactated at least once. The fluid milk from these animals may be sold for human or other consumption only if:

- The person does not advertise the milk for sale;
- The milk is sold directly to the consumer at the premises where produced; and
- No more than two producing dairy cows, nine producing sheep or nine producing goats are located on the premises where the milk is produced.”

### Raw milk cheese

It is legal to sell cheese made from raw milk if the cheese is aged for at least 60 days at a temperature greater than 35°F. This means that all cheeses consumed in less than 60 days must be made from pasteurized milk. Cheeses generally consumed in less than 60 days include cottage cheese, ricotta, Mexican-style cheeses, bloomy rind cheeses, and many washed rind cheeses.

If pasteurized milk is purchased from an outside source and transported to the plant, it is considered raw milk when it arrives at the plant. It should be repasteurized or utilized for raw milk cheese.

### Selecting a building or plant location

When selecting a building or plant location, consider the following factors:

- Proximity to sources of raw materials, distribution systems, and sales outlets
- Availability of skilled labor
- Access to water resources and waste discharge venues
- Size of property: Plan for adequate space for animal housing and milking parlor (if the business is a farmstead), raw milk storage, pasteurization, cheese manufacturing, and cheese aging. You also may wish to plan for expansion to accommodate business growth.
- Zoning: Contact the local Zoning and Planning Division to determine appropriate zoning (e.g., urban industrial, rural industrial, exclusive farm use). If the plant is within the city limits, the location is classified as an *urban industrial* zone. If the plant is located outside the urban growth boundaries within the county, it is classified as a *rural industrial* zone. If the plant is located on a farm (i.e., a farmstead

cheese plant), and the farm provides at least a quarter of the milk needed by the plant, it is classified as an *exclusive farm use* (EFU) zone.

- Permitted land use activities: Oregon counties list permitted land use activities under development codes in the county’s zoning ordinances. This information is available on county websites. For activities not listed in the zoning ordinances, contact the county Zoning and Planning Division to determine whether special approval is required.

## Permits

### Zoning permit

After selecting a suitable building or plant location, you must obtain a zoning permit. This permit is a government-issued document that allows the use of land for a specific purpose, such as an artisan cheese plant. This zoning permit is issued by the Zoning and Planning Division of the county where the plant is located. ODA requires that the zoning permit be obtained before beginning plant construction.

The steps for obtaining a zoning permit are as follows.

1. Determine the county in which the property is located and visit the county website. The application form, list of required enclosures, zoning map, assessment map, and other resources are available on county websites.
2. Set up a 1-hour preapplication conference with a land use planner in the county’s Zoning and Planning Division to get assistance with the application process. If you need additional help, contact a private land use planner, surveyor, or county assessor. Contact information for Oregon county assessors’ offices is available at <http://egov.oregon.gov/DOR/PTD/County.shtml>.



3. Access the interactive zoning map: This Geographic Information System (GIS) map is available on county websites. For example, the zoning map for Benton County is available at <http://gis.co.benton.or.us/ZoningMap/index.htm>. Use the interactive zoning map to determine the tax lot number, street address, and zoning of the property.
4. Prepare the application packet. The application packet varies among counties. Check your county website for specific requirements. For example, the zoning permit application packet requirements for Lake County are available at <http://www.lakecountyor.org/Forms/Applications/Zoning%20Permit%20Application%20Packet.pdf>. The application packet generally includes the following:
  - Application form (typically 4–5 pages). You will need to provide the location and size of the property, a narrative about the proposed use of the property, proposed methods of water supply and waste discharge, and details about parking and access to the property.
  - Assessment map (<http://www.ormap.com/maps/index.cfm>)
  - Administrative fee
  - Aerial view photograph (available on Google Earth at <http://earth.google.com/>) or a ground photograph of the property (not required by all counties)
  - Plot plan map drawn to scale showing the location and size of existing buildings and existing and proposed access roads. A sample plan and instructions for preparing a plot plan are available on some county websites.

The processing time for a zoning permit application varies based on county and zoning of the property. For example, in Washington County, it usually takes about 120 days to obtain a zoning permit if the property is located in an urban industrial zone and about 150 days if the property is located in a rural industrial zone.

After obtaining a zoning permit, apply for a waste water discharge permit. This permit is discussed next.

### Waste water discharge permit

Obtain information about waste water discharge permits from your city or county or from the Oregon Department of Environmental Quality (DEQ).

If the plant is located in an urban industrial zone, contact the city Public Works Department. The city is responsible for collecting waste water and transporting it to the waste water treatment plant. Depending on the kind of waste water, the city may require pretreatment by the facility discharging it.



If the plant is located in an EFU zone or a rural industrial zone, contact the county. Some counties support onsite sewage disposal. Depending on the size of the facility and amount of waste discharge, the county will decide whether a permit from DEQ is required.

An alternative for a farmstead operation is to contact the ODA Natural Resources Division ([http://www.oregon.gov/ODA/NRD/contact\\_us.shtml](http://www.oregon.gov/ODA/NRD/contact_us.shtml)) with regard to the most relevant Confined Animal Feeding Operation (CAFO) permit system that covers the farm and plant waste discharges.

If a DEQ permit is required, you can acquire it yourself or hire a consulting engineer or DEQ consultant. The permit must be obtained before discharge of waste water occurs. The discharge of waste water may be done through several types of disposal systems such as irrigation, seepage ponds, onsite sewage systems, and dry wells. The waste water must be pretreated and monitored to meet DEQ's standards. The pretreatment system must be set up with the help of a registered engineer or an approved design engineer.

DEQ has two permit systems:

- National Pollutant Discharge Elimination System (NPDES) permit: This permit is a requirement of the federal Clean Water Act and Oregon law. The EPA has authorized DEQ to issue this permit. It is required for discharge of waste water (processing water, wash water, noncontact cooling water, and sewage) into surface waters (wetlands, ponds, lakes, streams, rivers, etc.) through any type of channel.

- **Water Pollution Control Facilities (WPCF) permit:** This permit is a state requirement for discharge of waste water into the ground. It requires the waste water to be collected, screened for solids, and used on the property where it is produced. It allows use of waste water for irrigation and discharge into waste water lagoons, onsite sewage disposal systems, and underground injection control systems such as dry wells, sumps, etc. It does not allow discharge of waste water into surface waters.

Both the NPDES and WPCF permit systems use “individual” and “general” permits.

Individual NPDES and WPCF permits individually address dissimilar discharge activities of a business. General NPDES and WPCF permits cover a category of similar discharge activities. Individual permits are more expensive and need more time for issuance than general permits. This is because the individual permit process involves more review and inspection by DEQ, more frequent monitoring to ensure compliance with DEQ standards, and monitoring for various pollutants.

For detailed information, forms, and fees for general and individual DEQ permits, visit <http://www.deq.state.or.us/wq/wqpermit/genpermits.htm>.

### **New plants**

The steps to obtain a DEQ permit for a newly constructed plant are as follows.

1. Contact the nearest DEQ regional office. The DEQ officials will help determine whether an individual permit or a general permit would be applicable to cover the waste discharge activities of the business. Contact information for regional offices is available at <http://www.deq.state.or.us/about/locations.htm>.
2. Complete a land use compatibility statement (LUCS). The LUCS form can be obtained either from the DEQ website or from regional DEQ offices. Fill out the applicant’s section of the LUCS form and mail it to the local land use planning authority. The land use planning staff will review the form, fill out the local government section, sign and date it, and return it to you.

Regional land use contacts are available at <http://www.deq.state.or.us/pubs/permithandbook/lucs.htm>. The LUCS form and more information about LUCS are available at <http://www.deq.state.or.us/pubs/permithandbook/generallucs.pdf>.

3. Obtain a permit application from DEQ by mail, in person, or from the DEQ website. Forms and fee

schedules are available at <http://www.deq.state.or.us/wq/wqpermit/indinfo.htm>. The fee has two parts: an application fee and an annual fee for maintaining the permit. Both NPDES and WPCF permits are renewed every 5 years. No additional fee is required for renewal.

4. Mail the completed application form, along with the fees and the completed LUCS form, to DEQ at least 30 days prior to the start of the intended activity.

The permit application may be approved or denied. If the application for a general permit is denied, you may need to obtain an individual permit.

### **Existing plants**

If you purchase an existing plant, the DEQ water permit may be transferred to the new owner. To do so, submit a name change/transfer of ownership form and a transfer fee of \$74 to the nearest regional DEQ office. After receiving the permit, you may have to set up a treatment facility with the help of an approved engineer.

### **Building or structural permit**

The building or structural permit is issued by the local Building Department that has jurisdiction over the city or county where the plant is located.

Before applying for a building or structural permit, find out whether local zoning approvals are required for electrical and plumbing work. According to the Building Code Division (BCD) website (<http://www.oregonbcd.org/pdf/3019.pdf>), “permits are required for any new construction and alterations and additions to existing buildings, including structural, plumbing, mechanical, electrical, manufactured dwelling, boiler, and elevator work. However, there are some exceptions to permit requirements.”



To learn about permit exemptions, contact the local Building Department that has jurisdiction over the county where the plant is located. Application forms for various permits, including electrical, plumbing, mechanical, and building or structural permits are available at <http://www.bcd.oregon.gov/pdf/4613t.pdf>.

The steps to obtain a building or structural permit are as follows.

1. Find the local Building Department that has jurisdiction over the county where the plant is located. Use either the address locator form or the link to participating jurisdictions at <https://buildingpermits.oregon.gov/> to find contact information.
2. Schedule a preapplication meeting with the building services officer or Oregon certified plans examiner in the Building Department to discuss the permit process. He or she can provide information about application forms, application requirements, and fees.

Some counties use a “quick permits” system, which is an online “e-permitting” system. This system also can help you find contact information and printable applications. Access the e-permitting system at [https://buildingpermits.oregon.gov/index.cfm?fa=c\\_search.jurisLookup](https://buildingpermits.oregon.gov/index.cfm?fa=c_search.jurisLookup).

3. Prepare the application packet, which must include the following:
  - Copy of zoning permit
  - Copy of DEQ waste water discharge permit (if required)
  - Completed building permit application form
  - Two copies of your building plans, including plot map; floor plans; elevations; electrical, mechanical, and plumbing drawings; and structural calculations
  - Application fees
4. Mail, fax, or deliver the completed permit application form to the local Building Department.

You will be notified if a building plan review is required. After review, one set of the building plans will be returned to you with an “approved” stamp.

After approval of the building plan, the permit will be issued by mail, fax, or over the counter. Construction work must begin within 180 days from the date of issue of the permit. The approved building plan and the building permit must be available to the inspector at the construction site.



Resources to find a builder are:

- Oregon construction contractor license: [https://ccbed.ccb.state.or.us/ccb\\_frames/consumer\\_info/ccb\\_index.htm](https://ccbed.ccb.state.or.us/ccb_frames/consumer_info/ccb_index.htm)
- Hiring a licensed contractor: <http://www.hirealicensedcontractor.com/>

### Water use permit and water right

According to Oregon law, all water is publicly owned. The ODA requires that the water used in the plant be approved by the state water control authority, the Oregon Water Resources Department (OWRD). The OWRD website is at <http://egov.oregon.gov/OWRD/>.

Obtaining OWRD approval involves the following steps.

1. Obtain a water-use permit from OWRD.
2. Use the water in compliance with conditions specified in the permit.
3. Hire a certified water right examiner to get assistance with submitting proof of beneficial water use to OWRD.
4. Obtain a water right certificate from OWRD.

A water-use permit is an authorization from OWRD to use water and is necessary before beginning construction of a water system. Permit approval is not automatic. OWRD determines whether water is available during the time requested and whether the proposed use is allowed. The department also provides notice about proposed new usage of water to interested parties and publishes this information at [http://www1.wrd.state.or.us/cgi-bin/notices.pl?water\\_rights](http://www1.wrd.state.or.us/cgi-bin/notices.pl?water_rights). This



notice is to ensure the protection of public resources and the rights of existing water users. If anyone protests, the department will approve the permit application only if the protest is resolved in favor of the applicant.

After obtaining the water-use permit, a water right certificate must be obtained from OWRD. The water right allows the use of water in the plant from both groundwater (wells) and surface water (lakes, rivers, streams). However, surface water is currently unavailable in Oregon due to rights of prior users. Groundwater is the recommended source of water. City water can also be used. Additional information about each source is provided below.

The Oregon administrative rules (OAR) for water resource management can be found at [http://arcweb.sos.state.or.us/rules/OARS\\_600/OAR\\_690/690\\_310.html](http://arcweb.sos.state.or.us/rules/OARS_600/OAR_690/690_310.html).

Additional details regarding the permitting process are available at [http://www.wrd.state.or.us/OWRD/PUBS/aquabook\\_newrights.shtml](http://www.wrd.state.or.us/OWRD/PUBS/aquabook_newrights.shtml).

### **Groundwater**

Most businesses use groundwater from either an existing well or a newly constructed well. A well permit is required if more than 5,000 gallons of well water is used per day. This includes water used for cheese manufacture and wash water, but does not include water for irrigation. The permit is renewed every 5 years.

The permit application form for use of groundwater is available at <http://www1.wrd.state.or.us/pdfs/groundwaterapp.pdf>. The permit application guidebook is available at <http://www1.wrd.state.or.us/pdfs/groundbook96.pdf>.

The application packet must include the following:

- Completed application form
- Land-use zoning approval from the county
- Legal description of the property
- Fee (\$1,000)
- Map with description of the well and the plant, including well identification number

If a well identification number does not exist or has been lost, you will need to obtain one. The application form and instructions for obtaining a well ID are available at [http://www.wrd.state.or.us/OWRD/GW/well\\_id.shtml](http://www.wrd.state.or.us/OWRD/GW/well_id.shtml).

In addition to the above, the following items are required, depending on whether you will use an existing well or construct a new well.

**For an existing well:** Provide a well log (a detailed record of the well, its measurements, water level, etc.) to obtain a well identification number (if one does not exist). Detailed information on location of wells, maps, and water level data for existing wells is available at [http://www.wrd.state.or.us/OWRD/GW/well\\_data.shtml#View\\_Water\\_Level\\_Data](http://www.wrd.state.or.us/OWRD/GW/well_data.shtml#View_Water_Level_Data).

**For a well that is to be newly constructed:** Provide contact information for the well driller and the expected date of completion of construction. The well must be constructed by a licensed and bonded contractor. A list of licensed well constructors in Oregon is available at [http://apps2.wrd.state.or.us/apps/gw/well\\_license/default.aspx](http://apps2.wrd.state.or.us/apps/gw/well_license/default.aspx).

The *Consumer's Guide to Water Well Construction, Maintenance, and Abandonment*, published by OWRD, provides guidelines on how to construct a well. You can access the guide at <http://www.wrd.state.or.us/OWRD/PUBS/wellconguide.shtml>. The Pasteurized Milk Ordinance (<http://www.fda.gov/Food/FoodSafety/Product-SpecificInformation/MilkSafety/NationalConferenceonInterstateMilkShipmentsNCIMSModelDocuments/PasteurizedMilkOrdinance2007/default.htm>) also provides detailed guidelines on how to construct a well and processes for filtering, chlorinating, testing for potability, and checking for free chlorine.

Provide well information (number of wells, name and distance of nearest surface water body, elevation of the surface water body, etc.).

Describe methods used to manage and conserve water (for wells with natural flows).

### **Surface water**

The following information about surface water usage is provided as a reference in case surface waters become available to cheese makers in the future.

- Search for surface water availability in Oregon at [http://apps2.wrd.state.or.us/apps/wars/wars\\_display\\_wa\\_tables/](http://apps2.wrd.state.or.us/apps/wars/wars_display_wa_tables/).
- Locate information about an area's water rights, water availability, basins, etc. at [http://gis.wrd.state.or.us/apps/map/owrd\\_map/Default.aspx](http://gis.wrd.state.or.us/apps/map/owrd_map/Default.aspx).
- The permit application guidebook is available at <http://www1.wrd.state.or.us/pdfs/surfacebook96.pdf>.
- The application form and supplemental forms for use of surface water are available at <http://www1.wrd.state.or.us/pdfs/surfacewaterapp.pdf>.
- Uses of surface water that are exempt from obtaining a water right are listed at [http://www.wrd.state.or.us/OWRD/PUBS/aquabook\\_laws.shtml](http://www.wrd.state.or.us/OWRD/PUBS/aquabook_laws.shtml).

The application packet must contain the following:

- Completed application form
- Completed land-use information form signed and dated by the county planning authority. If the land-use information form cannot be completed while you wait, you can ask a local government representative to sign the receipt stub provided with the form and include it with the application filed with OWRD.
- A map that accurately shows the source of water and location of water use. The map should clearly indicate the township range, section, and tax lot numbers, the proposed points of diversion, and place of use. Details and instructions for creating a map are available in the guidebook.
- Legal description of the property. A copy of the deed, land sales contract, title insurance policy, or a lot book report prepared by a title company can provide this information. OWRD does not accept a copy of the tax bill.
- Water right examination fees and water usage recording fees. Information about these fees is available at <http://www1.wrd.state.or.us/pdfs/fees2007.pdf>.

### City water

City water is another recommended source of water. A permit from the city's Community Development Department is required for use of water from the city water system. Utility rates are based on consumption rates and are available on city websites.



## Licenses

When starting a cheese plant, the following licenses must be obtained:

- Dairy product plant license
- Vat pasteurizer operator's license
- Milk sampler/grader license
- Scale license

Details about each license follow.

### Dairy product plant license

The dairy product plant license is issued by the ODA Food Safety Division. This license allows you to receive milk and process or manufacture dairy products. It must be renewed annually.

The procedure for obtaining a license for new dairy plant construction is more involved than that for purchasing an existing business. Both procedures are outlined below.

#### Newly constructed dairy plant

1. Review laws and rules: ORS 621.122 (<http://www.leg.state.or.us/ors/621.html>) and OAR 603-024 ([http://arcweb.sos.state.or.us/rules/OARS\\_600/OAR\\_603/603\\_024.html](http://arcweb.sos.state.or.us/rules/OARS_600/OAR_603/603_024.html)).
2. Review the Pasteurized Milk Ordinance (PMO) guidelines (<http://vm.cfsan.fda.gov/~ear/pmo01toc.html>). The PMO provides standards for equipment and detailed guidelines on how to build a dairy plant. Although artisan cheese is not a Grade A product, the facility must meet PMO Grade A requirements because ODA has adopted the PMO regulations. A Grade A dairy plant is a facility that complies with the applicable provisions of the PMO.
3. Contact the ODA Food Safety Division inspector before starting construction. There is no charge for the initial consultation.
4. Prepare a plan for plant construction and submit it to ODA for written approval. Refer to PMO section 12—Plans for Construction and Reconstruction (<http://www.fda.gov/Food/FoodSafety/Product-SpecificInformation/MilkSafety/NationalConferenceonInterstateMilkShipments/NCIMSModelDocuments/PasteurizedMilkOrdinance2007/default.htm>).
5. Complete plant construction. It is recommended that the inspector be involved at the time of construction.
6. Arrange for inspection 1 or 2 weeks before starting operations. The inspector will inspect the completed

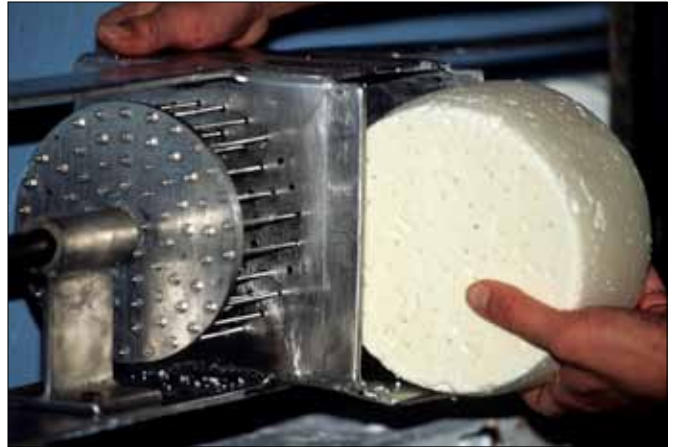
facility, examine equipment compatibility, and collect samples of milk and water and test them for regulatory compliance. If the inspection results are satisfactory, the inspector will grant approval and provide a license application with his or her signature, date, and establishment number on it.

7. Submit the completed license application with the appropriate fee (See Appendix III for fee schedules) to the inspector or to ODA.
  - If you submit the application to the inspector, you will receive an approval completion report and receipt of payment. These documents serve as the temporary license until the official license is received.
  - You can submit the completed application and appropriate fees to ODA as follows.
    - For payment with a credit card, mail or fax the completed application form, including credit card information and signature, to:  
Oregon Department of Agriculture  
635 Capitol Street NE  
Salem, OR 97301-2532  
Fax: 503-986-4746
    - For payment by check, mail the completed application form and check to:  
Oregon Department of Agriculture  
PO Box 4395  
Unit 16  
Portland OR 97208-4395
8. Receive the license by mail and post it in the business.

### **Existing business**

If the business is currently licensed by the ODA Food Safety Division, the steps are as follows.

1. Review laws and rules (<http://www.leg.state.or.us/ors/621.html>).
2. Obtain a license application from the Salem office:  
Oregon Department of Agriculture  
635 Capitol Street NE  
Salem, OR 97301-2532  
Phone: 503-986-4720  
Fax: 503-986-4729
3. Send the completed application with appropriate fees (see Appendix III for fee schedules), following the instructions in Step 7 above. If you pay the fees by check, you will receive a payment receipt. A receipt is not issued for credit card payments.
4. Receive the license by mail and post it in the business.



If you plan to add a new room to the plant, you must submit a plan to the inspector before starting construction and arrange for inspection after completion of construction. In case of minor changes to the existing plant, it is recommended that you notify the inspector in order to avoid unnecessary expenses. Notification is not required for minor changes, however.

### **Vat pasteurizer operator's license**

This license is issued by the ODA Food Safety Division. A vat pasteurizer operator's license officially authorizes a person to pasteurize milk and/or dairy products using vat or batch pasteurizing equipment. The license is not required if you use heat shock treatment rather than pasteurization.

This license is valid for 2 years. The license fee is currently \$50 for 2 years.

In order to obtain a vat pasteurizer operator's license, the applicant must pass an examination. The examination consists of both written and practical components. Both parts are mandatory. The exam has a total of 100 possible points, 50 points for the written section and 50 points for the practical exam. An overall minimum score of 80 percent *and* a minimum score of 40 points on each part is required to pass the examination. The exam can be taken any number of times.

The written examination is an open book exam. It can be taken on any week day between 8:00 a.m. and 5:00 p.m. at the plant site, the local area division office, or at the following ODA office:

Oregon Department of Agriculture  
Food Safety Division  
635 Capitol Street NE  
Salem, OR 97301-2532  
Phone: 503-986-4720  
Fax: 503-986-4729

The written exam includes questions pertaining to the following topics:

- Laws and regulations pertaining to pasteurization of milk for cheese making. The laws and regulations are contained in the PMO, ORS 621, and Division 24 ORS 621.122 (<http://www.leg.state.or.us/ors/621.html>).
- Theoretical and practical knowledge of pasteurization using a vat pasteurizer. Detailed information on these topics is available at <http://www.fda.gov/Food/FoodSafety/Product-SpecificInformation/MilkSafety/default.htm>.

Study material for the written exam can be obtained from the ODA Food Safety Division. Also see Appendix V of this publication.

The practical examination is taken after the written exam. The practical examination must be taken in a dairy processing facility. Before the practical examination, the ODA food safety inspector will check the functioning of the plant's vat.

During the practical exam, the operator must demonstrate the ability to do the following:

- Operate the pasteurizer
- Pasteurize the milk following PMO guidelines
- Keep records of pasteurization
- Care for, clean, and maintain equipment and utensils

The applicant will be notified of the results by ODA. After passing the exam, the applicant must send the license fees to the ODA Food Safety Division. The license will arrive by mail within a few days.



## HTST pasteurizer operator's license

This license is issued by the ODA Food Safety Division. The HTST pasteurizer operator's license officially authorizes a person to pasteurize milk and/or dairy products using high-temperature, short-time (HTST) pasteurizing equipment. The HTST pasteurizer is used for large-scale cheese production. Most artisan cheese makers are small-scale producers and use a vat pasteurizer.

Applicants are required to have at least 2 months practical experience helping to operate pasteurization equipment. Applicants are required to take a written and practical examination. The examination process is identical to that for the vat pasteurizer operator's license. The license fee is \$50.

## Milk sampler/grader license

The milk sampler/grader license is issued by the ODA Food Safety Division. The sampler/grader is responsible for grading milk received from an outside source and for collecting regulatory samples. This person may be a milk hauler who picks up milk at dairy farms or a milk receiver at the cheese plant. The license is valid for 1 year, with an annual license fee of \$25.

A written and practical test is required to obtain the license. A "Milk Receiving, Grading, and Transport" fact sheet (see Appendix V) can be used to prepare for the exam. Examination specifics are similar to those outlined under "Vat pasteurizer operator's license."

## Scale license

All commercially used weighing and measuring devices must be licensed with ODA's Measurements and Standard Division. Each type of device requires a separate license and associated fee. The fee is based on the manufacturer's rated capacity for that device. License classifications and fee details are available at [http://oregon.gov/ODA/MSD/device\\_license\\_list.shtml](http://oregon.gov/ODA/MSD/device_license_list.shtml). Licenses are renewed annually and are transferable to a new owner.

The following steps apply to scales with a manufacturer's rated capacity of 0–400 lb, the type most commonly used by artisan cheese makers.

1. Purchase the scale and arrange for installation by a licensed installer. The installer must complete a "placed in service report" (PISR). This report must be completed within 24 hours of installation of any new or used measuring or weighing device. Additional details about the PISR can be obtained at [http://oregon.gov/ODA/MSD/pisr\\_info.shtml](http://oregon.gov/ODA/MSD/pisr_info.shtml).

2. Obtain a scale license application form from the ODA Measurements and Standards Division (phone: 503-986-4670; e-mail: [msd-info@oda.state.or.us](mailto:msd-info@oda.state.or.us)). You will need to provide your business mailing address, location address of the scale, phone and fax numbers of the business, manufacturer's rated capacity of the scale, and how you would like to receive the application form.
3. Submit the completed application form, PISR, and fee (currently \$37 per scale per year) to the following address:  
Oregon Department of Agriculture  
Measurements and Standards Division  
635 Capitol Street NE  
Salem, Oregon 97301-2532

After completing this step, you may begin using the scale for commercial purposes.

A Measurements and Standards Division inspector will inspect the devices. He or she will place an approval seal on the device if it meets the required standards. This completes the scale licensing process.

## Approval of cheese label

Labels on food packages must be approved by the ODA Food Safety Division prior to use. An excellent summary of label requirements is outlined at [http://www.oregon.gov/ODA/FSD/docs/pdf/pub\\_label\\_general.pdf](http://www.oregon.gov/ODA/FSD/docs/pdf/pub_label_general.pdf). Nutritional content labels can be generated based either on USDA databases (<http://www.nal.usda.gov/fnic/foodcomp/search/>) or on compositional analysis at a food laboratory. Label requirements vary based on sales outlet. Thus, it is a good idea to contact ODA early. The OSU Food Innovation Center in Portland (503-872-6680) also offers assistance with label development.

## Planning and business registration

There are many factors to consider when planning a startup business, including selecting a business structure; understanding federal, state, city, county, and property tax obligations; selecting and reserving a business name; preparing a business plan; identifying required insurance; identifying sources of financing; and formal registration of the business.

Consider each of these steps carefully, as each will have long-term implications for your business. For example, the choice of business structure (e.g., sole proprietorship, family business, general partnership,

etc.) affects multiple aspects of a business, including tax obligations, liability, and ownership succession.

A business plan will provide you with a better understanding of the financial needs and profit potential of your business. It will be very useful in obtaining seed money and loans for starting a business and will create a strong foundation for new ideas, markets, and strategies in the future.

You will need to identify startup capital costs, cash-flow requirements, and a reserve pool of money before starting your business. One way to obtain loans and seed money is to present a business plan to angel investors. The premise behind such groups is to provide seed money for small-scale startups. Such groups also generally provide business expertise and mentoring. Applicants must go through a screening process to make sure they are a good financial risk. An example is the Valley Venture Group (V2G), which formed a financing agency in 2008 with the Willamette Valley Investors Network. Contact information is provided in Appendix II.

Another step is to establish and sustain good relationships with key bankers in your area. Experienced bankers are a good source of local information, including average income, level of competition, and real estate and rental values. Establishing a credit line, a good relationship with the banker, and a good credit history are all advantageous when applying for business loans.

You can obtain information on state loan programs from the Business Finance Section of the Oregon Economic and Community Development Department (503-986-0160; <http://econ.oregon.gov/>).



## Sources of assistance

The Oregon Secretary of State's Corporation Division operates a Business Information Center, which is a cooperative outreach effort of many state agencies, in Salem. A service of the Business Information Center is the "Business Wizard," which can provide a customized list of key contacts and Internet links to appropriate forms, publications, and information about requirements for doing business in Oregon. The web link to the Business Information Center is <http://www.filinginoregon.com/business/index.htm>.

The Secretary of State Office also provides reports and other services for and about Oregon businesses. They publish the guides "How to Start a Business in Oregon" and "Employer's Guide to Doing Business in Oregon," which offer information about sources of help for businesses. These guides are available at <http://www.filinginoregon.com/online/services.htm>.

"How to Start a Business in Oregon" provides a general checklist to guide an entrepreneur through the process of planning and registering a business. It also lists business assistance programs such as the following:

- Small Business Administration (<http://www.sba.gov/or>)
- Small Business Development Centers (SBDC): Oregon's Small Business Development Centers provide services to anyone who owns, operates, or is considering starting a small business in Oregon. Oregon's SBDCs can guide you through the basics of developing a business plan. SBDC contact information is available at <http://www.bizcenter.org>.

- Service Corps of Retired Executives/Counselors to America's Small Business (SCORE): SCORE is a volunteer organization whose professional members provide counseling and training to small business owners, managers, and potential owners. Information about SCORE chapters in Oregon is available at <http://www.score.org> (503-326-5211).

All of these guides and services are valuable resources and can be used independently or together, depending on the specific needs of your business.

Finally, you may wish to seek professional advice from a CPA and/or an attorney about legal and financial issues beyond those discussed in this publication.

- For referrals to a CPA: the Oregon Association of Independent Accountants (503-282-7247; <http://www.oaia.net>) and the Oregon Society of Certified Public Accountants (503-641-7200; <http://www.orcpa.org>)
- For referrals to attorneys and legal services: the Oregon State Bar (1-800-452-7636; <http://www.osbar.org>) and Legalzoom (<http://www.legalzoom.com>)

## Appendix I. Relevant Skills and Knowledge

### Artisan cheese-making skills

Each artisanal cheese is a unique product. The sensory characteristics (i.e., color, appearance, texture, and flavor) of a certain type of artisan cheese vary from batch to batch. This individualized quality distinguishes artisan cheese from industrial, mass-produced cheeses. Nonetheless, the finest cheese may vary only within a certain standard if it is to be commercially marketable. Thus, artisan cheese makers adhere to the traditional methods of their craft, while working to bring forth the individualized quality in their product. Achieving the right blend of uniqueness and consistent high quality is an art that requires integration of craft with scientific principles. Hence, it is necessary to have relevant knowledge and experience in making artisan cheese (Kindstedt 2005).

### Knowledge of food safety

The production of safe, high-quality products should be a primary goal of the artisan cheese producer. Knowledge of food safety in the cheese industry begins with an appreciation for cleanliness. Food safety comes from good agricultural practices, an understanding of microbiology, good manufacturing practices, safe procedures for cleaning and sanitizing, and an understanding of principles of a Hazard Analysis Critical Control Point (HACCP) (Curtis 2005).

You will need to have an understanding of microbiology and the factors that suppress or promote the growth of organisms (e.g., temperature, water, atmospheric conditions during storage, and acid production). Experienced cheese makers understand these factors, their effects, and how to use them to their advantage. Jay et al. (2005) provide an overview of how these factors affect the growth of organisms.

Good Manufacturing Practices (GMPs), Sanitation Standard Operating Procedures (SSOPs), and HACCP are explained briefly below. Although these practices are valuable to an efficient food manufacturing business, they are not a specific part of the PMO or required by ODA.

You should also be aware of relevant government regulations (e.g., aging of raw-milk cheeses for at least 60 days) and legal requirements for food labeling (see page 11).



### Good Manufacturing Practices

An organization that is conscientious about food safety documents current Good Manufacturing Practices (GMPs). GMPs address the design of the manufacturing environment, the attire worn by employees in the processing plant, and personal hygiene practices at work. Having both a documented set of GMPs and an employee handbook that addresses the “whys” of the GMPs will benefit your business (Curtis 2005).

### Standard Sanitation Operating Procedures

Similarly, procedures for cleaning and sanitizing are typically documented in the form of pre-operational and operational Standard Sanitation Operating Procedures (SSOPs). It is important to have a basic knowledge about SSOPs (Curtis 2005).

### Hazard Analysis Critical Control Point

It is important to be aware of the principles of a Hazard Analysis Critical Control Point (HACCP). The emphasis of HACCP is to identify and control potential hazards so that real-time decisions can be made to ensure a safer end product. HACCP can and should be adapted to each individual cheese-making process. The artisan cheese maker who has intimate knowledge of the cheese-making process should be actively involved in the quality and safety control of the cheese being produced (Curtis 2005).

## Management experience and knowledge of target market, business, and risks

Before venturing into a new business, you should be sure there is sufficient demand for your product; understand the target market, the various activities of the business, and the industry in which the business operates; and study the feasibility of the business. After starting your business, you will never again have such a good opportunity to do comprehensive planning. This section provides some suggestions related to these issues.

Good market research is essential for the success of a startup business. A farmer's market or local restaurant can be a good venue to start selling cheese, obtain preliminary feedback from customers, and better understand customers' needs and preferences.

Sound accounting practices, financial management, and an approximate estimation of how long it will take to break even are important for a startup business. A good break-even analysis requires a good understanding of major cost drivers of the business. An entrepreneur with experience in the artisan cheese industry can readily recognize important cost drivers, such as ingredients (e.g., milk), plant equipment, human resources, packaging, labels, shipping, and distribution. A successful entrepreneur also gives careful thought to production capacity, pricing strategy, cash flow, marketing, sales, and distribution strategies when performing a break-even analysis.

It is desirable to have experience in managing people, a cheese plant, and a farm (if applicable). You will need to provide excellent customer service and network effectively with relevant agencies, cooperatives, and potential customers. Good editorial testimonies and word-of-mouth recommendations from customers are very effective and affordable means of advertising for a startup artisan cheese business.

You must be aware of potential risks involved in the business. For example, some potential risks for a new artisan cheese startup include the following:

- Yielding to the temptation to develop too many new cheeses without checking on availability of resources, plant capacity, market demand, and distribution strategies
- Inadequate attention to good safety practices and quality
- Selling to customers who do not pay on time

It is important to have a good understanding of the activities of your business. These interrelated activities add value in transforming raw materials to finished product and are referred to as value chain activities (Porter 1985). An efficient value chain results in efficient operations. A business that consistently performs some or all of its value chain activities better than other businesses can have a distinct edge over its competitors.

For an artisan cheese business, value chain activities include research and development of new cheeses, selection of milk suppliers, procurement of ingredients and equipment, human resource management, pricing strategy, financial management, transformation of milk to cheese, food safety practices, quality control measures, selection of sales outlets and storage areas, marketing and sales, packaging, labeling, distribution, and customer service.

Based on the market, value chain, and industry analyses, you should analyze the strengths, weaknesses, opportunities, and threats (SWOT) for your business. The SWOT analysis, industry analysis, and value chain analysis will allow you to effectively study the feasibility of your business. Successful entrepreneurs do these analyses quickly (based on their gut as opposed to documented detailed analyses) before launching the venture and then constantly monitor the environment external to their business. The purpose of these analyses is to do a quick feasibility study and to formulate a business strategy to leverage strengths and opportunities, while minimizing risks by taking into account threats and weaknesses. Pages 234–235 of Paul Kindstedt's book (see Appendix IV) provide a quick SWOT analysis for artisan cheese businesses.

In summary, for a startup business to be successful, it is essential to do the following:

- Understand the target market, business activities, and industry
- Have experience in managing people, plant, and finances
- Be aware of potential risks involved in the business
- Realize the importance of human networks and excellent customer service
- Receive good testimonies from customers and media editors
- Be prepared to handle surges in customer demand



# Appendix II. Resources for the Artisanal/ Farmstead Cheese Maker

## References

- Cheese Reporter  
<http://www.cheesereporter.com>
- Curtis, P.A. *Guide to Food Laws and Regulations*, 1<sup>st</sup> ed. 2005. Blackwell Publishing, 2121 State Avenue, Ames, IA 50014.
- Kindstedt, Paul S. *American Farmstead Cheese: The Complete Guide to Making and Selling Artisan Cheeses*. 2005. Chelsea Green Publishing, 85 N. Main St., Suite 120, White River Junction, VT 05001.
- Kosikowski, Frank and Vikram Mistry. *Cheese and Fermented Milk Foods*, 3<sup>rd</sup> ed. 1997. Published by F.V. Kosikowski, L.L.C., 11507 Saunders Haven Ct., Great Falls, VA 22066.
- May, James M. *Modern Food Microbiology*, 7<sup>th</sup> ed. 2005. Springer Science and Business Media, Inc. 233 Spring Street, New York, NY 10013.
- Porter, Michael E. *Competitive Advantage*. 1985. Free Press, 1230 Avenue of the Americas, New York, NY 10020.

## Producer organizations

### Local dairy and cheese organizations

- Dairy Farmers of Oregon  
<http://www.dairyfarmersor.com/>
- Oregon Cheese Guild  
<http://www.oregoncheeseguild.org/index.html>
- Oregon Dairy Industries  
<http://odi.fst.oregonstate.edu/>
- Oregon Dairy Council  
[http://www.oregondairycouncil.org/dairy\\_links/](http://www.oregondairycouncil.org/dairy_links/)
- Oregon Tilth  
<http://www.tilth.org>

### National dairy and cheese organizations

- American Cheese Society  
<http://www.cheesesociety.org>
- American Dairy Goat Association  
<http://www.adga.org/>
- Dairy Practices Council  
<http://www.dairyipc.org/index.htm>
- Dairy Sheep Association of North America  
<http://www.dsana.org/>

## Government agencies

- FDA Center for Food Safety and Applied Nutrition  
<http://www.cfsan.fda.gov/>
- The National Organic Program  
<http://www.ams.usda.gov/nop>
- Oregon Department of Agriculture, Food Safety Division  
[http://www.oregon.gov/ODA/FSD/program\\_dairy.shtml](http://www.oregon.gov/ODA/FSD/program_dairy.shtml). E-mail: [fsd-expert@oda.state.or.us](mailto:fsd-expert@oda.state.or.us)

## Government publications

- Oregon business guides  
<http://www.filinginoregon.com/online/services.htm>
- From Growing to Processing: A Guide for Food Processors*, published by Oregon Department of Agriculture. This guide can be obtained from ODA or through university libraries.

## University organizations

- OSU Dairy Processing Program  
<http://oregonstate.edu/dept/foodsci/dairy/welcome.htm>  
Dr. Lisbeth Goddik  
Associate professor and Extension specialist in dairy processing  
Phone: 541-737-8322  
Fax: 541-737-1877  
E-mail: [Lisbeth.goddik@oregonstate.edu](mailto:Lisbeth.goddik@oregonstate.edu)
- OSU Department of Animal Sciences  
Dr. Michael J. Gamroth  
Oregon State University  
112 Withycombe  
Corvallis, OR 97331  
Phone: 541-737-3316  
E-mail: [mike.gamroth@oregonstate.edu](mailto:mike.gamroth@oregonstate.edu)
- Food Innovation Center (Oregon State University/  
Oregon Department of Agriculture)  
<http://fic.oregonstate.edu/economic-and-marketing-research>  
Cathy Durham, program leader—Marketing and Trade Economics Program  
Phone: 503-872-6680  
Fax: 503-872-6648  
E-mail: [cathy.durham@oregonstate.edu](mailto:cathy.durham@oregonstate.edu)

Sarah Masoni, product development manager

Phone: 503-872-6655

E-mail: [sarah.masoni@oregonstate.edu](mailto:sarah.masoni@oregonstate.edu)

OSU Small Farms website

<http://smallfarms.oregonstate.edu/>

University of Guelph Department of Food Science

<http://www.foodsci.uoguelph.ca/cheese/welcom.htm>

Center for Sustaining Agriculture and Natural Resources, Washington State University, College of Agriculture

<http://csanr.wsu.edu/>

University of Nebraska, Food Processing Center, "The Specialty Cheese Market"

[http://fpc.unl.edu/Reports/The\\_Specialty\\_Cheese\\_Market.pdf](http://fpc.unl.edu/Reports/The_Specialty_Cheese_Market.pdf)

University of Idaho/Boise State/Idaho State

<http://www.techhelp.org/indexcfm?fuseaction=services.food>

Small Business Development Center

Thomas Dorr, director

119 N. Commercial Street, Suite 195

Bellingham, WA 98225-4455

Phone: 360-733-4014

E-mail: [tom.dorr@wwu.edu](mailto:tom.dorr@wwu.edu)

## Equipment

Agri-Services LLC

Larry Wampler

11606 Greencastle Pike

Hagerstown, MD 21740

Office phone: 301-223-6877

Cell: 301-573-4044

E-mail: [lwamper@afo.net](mailto:lwamper@afo.net)

Dairy Technologies USA

<http://www.schuller.us/>

Darlington Dairy Supply

<http://www.ddSCO.com/>

Equipment Specialists (used dairy equipment)

<http://www.equipmentspecialists.com/>

Fromagex

<http://www.fromagex.com/>

Heritage Equipment Company

<http://www.heritage-equipment.com/>

International Machinery Exchange (new and rebuilt equipment)

<http://www.imexchange.com/about.html>

JayBee Precision

<http://www.jaybeeprecision.com/>

Kusel Equipment

<http://www.kuselequipment.com/>

Schier Company, Inc.

<http://www.schiercompany.com/>

Sunnyside Dairy Equipment and Supplies

116 South 9th Street

Sunnyside, WA 98944

Office phone: 509-839-2697

Cell: 509-840-1346

Fax: 509-839-6461

## Utensils, supplies, and cultures

Dairy Connection

<http://www.dairyconnection.com>

Phone: 608-242-9030

E-mail: [getculture@ameritech.net](mailto:getculture@ameritech.net)

Dairy Fab LLC (curd knives)

<http://www.curdknives.com>

Phone: 920-849-4452

Danlac

<http://www.danlac.com>

Fromagex

<http://www.fromagex.com/>

Glengarry Cheese Making and Dairy Supplies

<http://www.glengarrycheesemaking.on.ca>

Hoegger Supply Co.

Phone: 800-221-4628

Nelson Jameson

<http://www.nelsonjameson.com>

Phone: 800-826-8302

New England Cheese Making Supply

<http://www.cheesemaking.com>

## Plant construction

Cascade Floors (floor coatings)

<http://www.cascadefloors.com/>

Floor Seal Technology, Inc. (concrete moisture control)

<http://www.floorseal.com/>

Hansen-Rice, Inc. (construction)

<http://www.hansen-rice.com/indexy.cfm>

Hussmann (refrigeration system installation, service, and maintenance)

<http://www.hussmann.com/>

Zero-loc (insulated panel manufacturing and installation)

<http://www.zeroloc.com/>

## Laboratory services

Am Test, Inc.

[http://www.amtestlab.com/services/testing\\_services.asp](http://www.amtestlab.com/services/testing_services.asp)

Bodycote Food Products Lab

12003 NE Ainsworth Circle, Suite 105  
Portland, OR 97220  
Phone: 503-253-9136

Columbia Food Laboratories, Inc.

<http://www.columbiafoodlab.com/>  
36740 E. Historic Columbia River Highway  
Corbett, OR 97019  
Phone: 503-695-2287

Exact Scientific Services

<http://www.exactscientific.com/>

Food Quality Labs

6400 SW Canyon Court, Suite 80  
Beaverton, OR 97221  
Phone: 503-297-3636

Microchem Laboratory, Inc.

<http://www.microchemlab.net/>

Pace Analytical

<http://www.pacelabs.com/about-us/locations/seattle-wa.html>

## Cheese consultants

Alliance Pastorale

Ali S. Haidar, international development manager  
<http://www.alliancepastorale.fr/>  
E-mail: [international@alliancepastorale.fr](mailto:international@alliancepastorale.fr)

Bates Consulting

Marc Bates  
E-mail: [cheeseguy@pullman.com](mailto:cheeseguy@pullman.com)

Cheezsorce

Neville McNaughton  
PO Box 15009  
St. Louis, MO 63119  
Phone: 314-664-4397  
E-mail: [Cheezsorce@sbcglobal.net](mailto:Cheezsorce@sbcglobal.net)

NW Ag Business Center

<http://www.agbizcenter.org/>  
Phone: 888-707-2021

Washington Manufacturing Services

<http://www.wamfg.org/>

## Financial agency

Valley Venture Group (V2G)

Krishna Rao  
Phone: 541-760-1700  
E-mail: [krao@rr2llc.com](mailto:krao@rr2llc.com)

*The Oregon State University Extension Service neither endorses products and companies listed nor intends to discriminate against products or companies not mentioned.*

## Appendix III. License Fee Structure

(July 1, 2009—June 30, 2010)

### Milk fee schedules

<b>Fluid Milk Producer</b>	License type 02
<b>Producer-Distributor Grade A</b>	License type 03
<b>Producer-Distributor Grade B</b>	License type 04
<b>Fluid Milk Distributor</b>	License type 05
<b>Non-Processing Distributor Grade A</b>	License type 06
<b>Non-Processing Distributor Grade B</b>	License type 07
<b>Dairy Products Plant</b>	License type 19
Annual Gross Sales	Fee
\$0 to \$50,000	\$137
\$50,001 to \$500,000	\$190
\$500,001 to \$1,000,000	\$324
\$1,000,001 to \$5,000,000	\$487
\$5,000,001 to \$10,000,000	\$649
Greater than \$10,000,000	\$812

<b>Contract Milk Hauler</b>	License type 20
Flat rate fee	\$25 each

### Dairy operator's license fees

<b>Milk Sampler/Grader (expires yearly 6/30)</b>	License type 18
Flat rate fee	\$25
<b>Vat Pasteurizer (2-year license)</b>	License type 79
Flat rate fee	\$50
<b>HTST Pasteurizer (2-year license)</b>	License type 81
Flat rate fee	\$50

Source: [http://www.oregon.gov/ODA/FSD/licensing.shtml#License\\_fee\\_structure\\_July\\_1\\_2008\\_June\\_30\\_2009](http://www.oregon.gov/ODA/FSD/licensing.shtml#License_fee_structure_July_1_2008_June_30_2009)

## Appendix IV. References

### Publications

- Curtis, P.A. *Guide to Food Laws and Regulations*, 1<sup>st</sup> ed. 2005. Blackwell Publishing, 2121 State Avenue, Ames, IA 50014.
- From Growing to Processing: A Guide for Food Processors*. 2000. Oregon Department of Agriculture.
- Jay, M., M.J. Loessner, and D.A. Golden. *Modern Food Microbiology*, 7<sup>th</sup> ed. 2005. Springer, New York, NY.
- Kindstedt, Paul S. *American Farmstead Cheese: The Complete Guide to Making and Selling Artisan Cheeses*. 2005. Chelsea Green Publishing, White River Junction, VT.
- Porter, Michael E. *Competitive Advantage*. 1985. Free Press, New York.

### Websites

The web links mentioned in this publication were accessed through the following home pages. All of these home pages were verified as accessible in August 2009.

- Benton County Community Development Planning Division  
<http://www.co.benton.or.us/cd/planning/index.php>
- Columbia County Planning Division  
<http://www.co.columbia.or.us/lds/planning.php>
- Grade “A” Pasteurized Milk Ordinance, 2003 revision  
<http://www.cfsan.fda.gov/~ear/pmo03toc.html>
- Lake County Planning and Building Division  
<http://www.co.linn.or.us/Planning/lcd.htm>

- Oregon Administrative Rules, OAR chapter 603  
<http://www.sos.state.or.us/archives/banners/rules.htm>
- Oregon Building Codes Division  
<http://www.oregonbcd.org/>
- Oregon Construction Contractors Board (the Oregon construction contractors license search page)  
<http://www.oregon.gov/CCB/>
- Oregon Department of Agriculture, Food Safety Division, Dairy Program page  
[http://www.oregon.gov/ODA/FSD/program\\_dairy.shtml](http://www.oregon.gov/ODA/FSD/program_dairy.shtml)
- Oregon Department of Agriculture, Measurements and Standards Division, Weighing and Measuring Devices page  
[http://www.oregon.gov/ODA/MSD/device\\_intro.shtml](http://www.oregon.gov/ODA/MSD/device_intro.shtml)
- Oregon Department of Environmental Quality, Industrial Water Quality permit program page  
<http://www.oregon.gov/DEQ/>
- Oregon Hire a Licensed Contractor  
<http://www.hirealicensedcontractor.com/>
- Oregon Revised Statutes, ORS chapter 621  
<http://www.leg.state.or.us/ors/>
- Oregon Water Resources Department  
<http://www.wrd.state.or.us/>
- Polk County Planning Division  
<http://www.co.polk.or.us/Planning>
- Washington County Community Development Code  
<http://washtech.co.washington.or.us/LDS/index.cfm?id=7>

## Appendix V. Glossary

Farmstead cheese	Also known as “cheese from the farm.” In a farmstead operation, the cheese plant is on the farm, and the milk for the cheese plant comes from animals raised on the farm.
Artisan cheese	Individualized, unique cheese that is handmade in small batches using traditional methods and minimal mechanization. These products are differentiated from industrial mass-produced cheeses.
BCD	Oregon Building Codes Division
CAFO	Confined Animal Feeding Operation. The CAFO permit program assists farm owners and operators to manage animal wastes without contaminating surface water and groundwater. In Oregon, the program is overseen by ODA’s Natural Resources Division.
CPA	Certified Public Accountant
DEQ	Department of Environmental Quality. An Oregon regulatory agency whose objective is to protect the quality of Oregon’s environment.
EFU	Exclusive Farm Use zone. The zoning of a plant if it is located on the farm.
FDA	Food and Drug Administration
GIS	Geographic Information Systems. GIS maps are available on county websites. These maps can be used to locate a property and determine its zoning, street address, and tax lot numbers.
GMP	Good Manufacturing Practice
HACCP	Hazard Analysis Critical Control Point
HTST	High-temperature, short-time pasteurizer
LUCS	Land Use Compatibility Statement
NPDES	National Pollutant Discharge Elimination System permit
OAR	Oregon Administrative Rule
ODA	Oregon Department of Agriculture
ORS	Oregon Regulatory Statute
OWRD	Oregon Water Resources Division
PISR	Placed In Service Report
PMO	Pasteurized Milk Ordinance. According to the PMO, the “Grade ‘A’ PMO, with Appendices, is recommended for legal adoption by states, counties, and municipalities in order to encourage greater uniformity and a higher level of excellence of milk sanitation practice in the United States. An important purpose of this recommended standard is to facilitate the shipment and acceptance of milk and milk products of high sanitary quality in interstate and intrastate commerce” (PMO, 2005).
SBDC	Small Business Development Center
SCORE	Service Corps of Retired Executives. A resource partner with the Small Business Administration.
SSOP	Standard Sanitary Operating Procedure
WPCF	Water Pollution Control Facilities permit

### Acknowledgments

This document was made possible with help from many individuals. Special thanks to Janice Neilson, Kathryn Obringer, Laurie and Terry Carlson, Marc Bates, Janice Chellis, and Jim Postlewait.

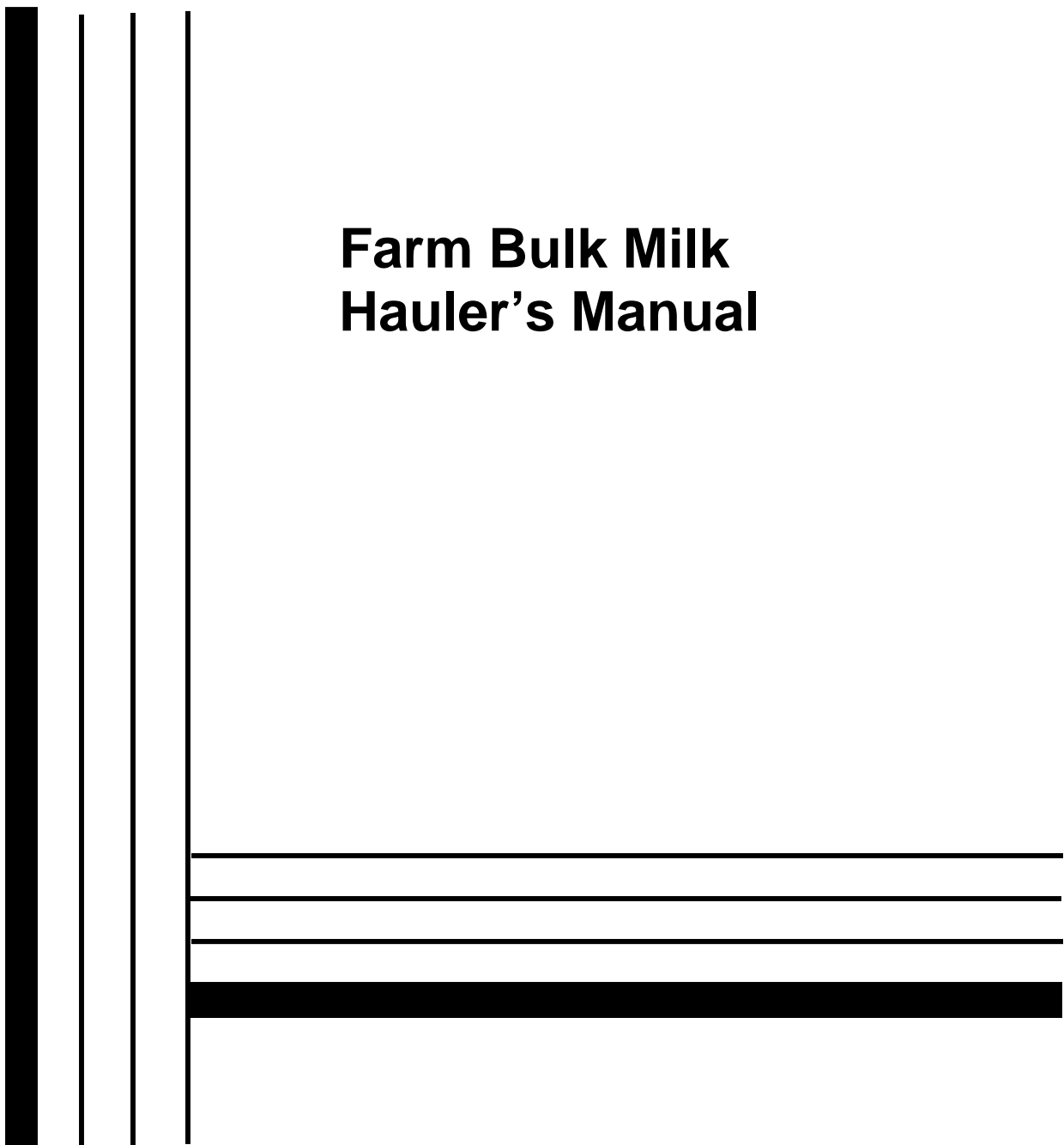
## **Appendix VI. ODA Study Materials**

**Farm Bulk Milk Hauler's Manual**

**Milk Receiving, Grading and Transport Fact Sheet**

**Vat Pasteurization**

# Farm Bulk Milk Hauler's Manual



**FSQS**



**United States  
Department of  
Agriculture**

**Food Safety  
and Quality  
Service**

**Poultry and Dairy  
Quality Division**

**Dairy Standardization  
Branch**



Acknowledgement is made to the Manufacturing Milk Committee, Dairy Division, National Association of State Departments of Agriculture for their help in preparing the Farm Bulk Milk Hauler's Manual.

August 14, 1980

## FARM BULK MILK HAULERS MANUAL

### Table of Contents

		Page
I.	Purpose	1
II.	Introduction	1
III.	Licensing	1
IV.	Definition of Terms	2
V.	Appearance	2
VI.	Checklist Prior to Starting on the Route	3
VII.	Odor and Appearance of Milk	
	Odor	4
	Appearance	6
VIII.	Measuring the Milk.	7
IX.	Correct Agitation Time	8
X.	Temperature	8
XI.	Sampling Plans	9
XII.	Sampling the Milk	9
XIII.	Sani-Guide Discs	11
XIV.	Connection of Hose	11
XV.	Pumping the Milk	11
XVI.	Disconnect the Hose and Rinse the Farm Bulk Tank	11
XVII.	Recording Results	12
XVIII.	Final Farm Check	12
XIX.	Recap of Proper Procedure	12
XX.	Composition of Milk	15
XXI.	Milk Quality	17
XXII.	Rules for Good Milking Techniques-	17
XXIII.	Sample Questions	18

## **Farm Bulk Milk Haulers Manual**

### **I. Purpose**

The purpose of this manual is to provide farm bulk milk haulers with the proper techniques, principles, and procedures to use on the job. It will also serve to refresh the experienced hauler with the same techniques and principles which are required by the dairy industry.

Uniform methods are essential in agitating, weighing, sampling, and pick-up of farm bulk milk in order to assure the producer, plant manager, and quality control personnel that everyone concerned is being treated equally and fairly.

### **II. Introduction**

The quality of milk delivered to the plant depends on how well the hauler identifies and eliminates all unsatisfactory milk before pumping it into the tank truck. The frequency of pick up should never be longer than three days.

The licensed bulk milk hauler is more than a truck driver. He is frequently the judge of acceptable milk quality before it leaves the farm. He determines the amount of milk purchased; and is the collector of official samples for laboratory examination and payment.

This places a great responsibility on the bulk hauler. He must check the odor and appearance of the milk. He must also use accurate and proper procedures in measuring and sampling the milk.

Sampling and measuring the milk are important duties to insure a fair and accurate transaction between the producer and buyer. The milk must always be measured accurately and a true sample obtained so that quality and composition tests will accurately represent the contents of the farm bulk tank. If proper procedures are not strictly followed and an error in evaluation occurs, the milk may have been improperly accepted or rejected. This will cause an economic loss for either the producer or the plant.

If there is more than one bulk tank located on a farm, each tank should be separately sampled, measured, and checked for odor and appearance. When a bulk tank is in use, no milk stored in cans may be sampled or picked-up for delivery.

### **III. Licensing**

The grading, sampling, measuring, and pumping of milk from a farm bulk tank, and the delivery of the milk to a dairy plant, receiving station, or transfer station shall only be done by a licensed bulk hauler. This also includes the relief or part time hauler.

The valid license shall be kept in the hauler's place of employment or the office where he most frequently delivers milk. This license shall be available for inspection upon the request of an authorized official.

The hauler should also receive a wallet sized, numbered identification card to certify his right to sample. This card shall be carried with him at all times on the job.

A prospective hauler shall immediately apply for licensing. Upon receipt of the application, the appropriate state regulatory agency will issue the prospective hauler an instruction manual, and notification of the date and location of the next bulk haulers training and licensing session. Upon satisfactory completion of the bulk milk haulers examination, a permanent hauler and sampler license will be issued.

The license shall be renewable yearly and every licensed hauler is required to attend a licensing session once every three years as a refresher course.

#### IV. **Definition of Terms**

1. **Farm Bulk Milk Hauler** - A licensed person who grades, samples, and measures the milk in a farm bulk tank; pumps the milk from the tank; and delivers the milk to a dairy plant, receiving station, or transfer station.

2. **Milk** - The normal lacteal secretion, practically free from colostrum, obtained by the complete milking of one or more healthy cows.

3. **Producer** - The person or persons who exercise the control over the production of milk delivered to a processing plant or receiving station, and those who receive payment for this product.

4. **Dairy Farm** - A place or premise where one or more milking cows are kept, a part or all of the milk produced thereon being delivered, sold, or offered for sale to a plant for manufacturing purposes.

5. **Farm Bulk Tank** - The tank located on a dairy farm in which properly cooled raw milk is stored prior to collection by a bulk milk hauler.

#### V. **Appearance**

The bulk milk hauler is a handler of human food and his appearance and sanitary habits should reflect this role. A clean, neat appearance and good personal habits create an image vital to the dairy industry and establishes confidence in the hauler's ability to do his job. White clothing is the most impressive. However, color is not as important as cleanliness.

The clean outward appearance of the bulk truck also establishes confidence in the hauler's ability to handle a food product. The bulk tank truck must be of sanitary design and construction. Preferably the tank should meet the requirements of the 3-A Standard for farm pick up service. Any new or replacement tank must meet the applicable 3-A Standard.

#### VI. **Checklist Prior to Starting on the Route**

The hauler must have certain supplies and equipment in order to satisfactorily perform the requirements of measuring, sampling, pumping, and transporting the milk. Before starting out, check for the following supplies and equipment.

1. The tank truck and the transfer equipment has been properly washed and sanitized. The responsibility to clean and sanitize the tank and/or pump of the farm bulk truck may lie with a plant employee. However, it is the bulk hauler's responsibility to check the tank and pump to insure its sanitary condition.

2. The most recent wash tag must be attached. This wash tag should contain the following information:

- a. The location the tank was cleaned and sanitized.
- b. The date and time.
- c. The signature or initials of the employee who washed and sanitized the tank.
- d. The type of sanitizer used.
- e. A statement that this tag must not be removed until the tank is recleaned.

3. The following sampling equipment is present on the truck:

- a. An adequate supply of sample containers.
- b. Sample transfer instrument, unless stored and maintained at the farm.
- c. An accurately prepared sanitizing solution of 100 p.p.m. chlorine or its equivalent in a suitable container that is covered.
- d. Insulated sample carrying case.
- e. Adequate ice or other refrigerant to maintain sample temperature of 32-40°F.

4. A dial thermometer with an adjustment for calibration which is accurate to plus or minus 2°F. The thermometer used must include the normal temperature range of milk, and a dial range of 25°F to 12.5°F is recommended.
5. An adequate supply of sani-guide discs.
6. A waterproof, indelible marker to identify samples.
7. Watch or other timing device.
8. Adequate supply of milk weight tickets and a pencil to record the required information.
9. Single service paper towels.
10. . Flashlight.

## VII. Odor and Appearance of Milk

### Odor

The most important factor in consumer acceptance of dairy products is flavor. Milk flavor control must begin at the farm.

It is important that the hauler not taste the milk for off-flavors because of potential health problems caused by raw milk. Nevertheless, the hauler should realize that off-flavors in raw milk invariably show up as off-odors, and if off-odors are found by the hauler, off-flavors are also present.

Normal milk has virtually no odor. The hauler should have a firm impression as to what constitutes normal milk so that he can judge the milk he collects with confidence.

If the milk has a serious off-odor or appearance (such as those that follow), the hauler should reject it. The plant fieldman should be contacted immediately so that the cause can be determined and corrected. In case a hauler is uncertain as to whether a tank should be accepted, contact the plant for guidance, and obtain a sample for the plant on which a final decision may be made.

Any slight change in quality should be immediately brought to the attention of the producer and the milk plant by making an appropriate comment on the producer's milk weight ticket. This warning may often be the earliest indication of the start of trouble.

Some of the more common off-odors and their possible causes are:

1. **Feed.** The feed a cow eats may impart certain odors to milk. Some stronger feeds will carry through more noticeably than others. Odors resembling green grass, silage, turnips, and alfalfa hay are outstanding examples. Feed odor can be minimized or eliminated by taking the cows off offending feeds at least 4 hours before milking. Certain feeds can be

detected in milk if fed to the cow even 15 to 30 minutes before milking

2. **Barny.** This odor is caused by cows breathing foul air due to poor barn sanitation and/or ventilation. Proper ventilation, good sanitation, and proper milking procedures will correct this problem.

3. **Foreign.** Any seriously objectionable odor foreign to milk, such as sanitizers, fly spray, paint, oil, kerosene, creosote, or a medicinal substance, will render the milk unacceptable or unfit for use. Such an odor may be caused by direct contamination of the milk or may be absorbed from the air.

Sanitizers are included in this category because the residue of sanitizers, such as hypochlorite and iodophor, if left on dairy equipment, may be absorbed by milk and impart a foreign odor. Phenolic compounds **used in** udder ointments may combine with **iodophor or hypochlorite sanitizers** to form a highly objectionable foreign odor which is detectable in a very low concentration.

4. **Garlic/ Onion.** This obnoxious weed flavor, imparted to milk when the cow eats garlic, onions, or leeks, is not classified as one of the usual feed flavors described above. The garlic/onion flavor is recognized by the distinctive odor suggestive of its name It may be **actually so objectionable** as to render the milk undesirable for use.

5. **Musty.** This odor is suggestive of musty or moldy hay. It **may be** absorbed directly by the milk, but is more likely to come from feed or stagnant water consumed by the cow.

6. **Rancid.**

A. **Oxidative Rancidity.** Oxidized milk gives off odors usually described as cardboardy, metallic, or tallowy. It is usually more noticeable during the winter months when cows are on dry feed. The most frequent cause of oxidative rancidity is by the contamination of milk with small amounts of copper or iron from milk contact surfaces.

B. **Hydrolytic Rancidity.** Hydrolytic rancidity found in milk will give off an odor resembling spoiled nut meats. It is more noticeable during winter, when cows are on dry feed, or during late lactation. Agitation of warm raw milk in the presence of air, causing foaming, will result in a rancid type odor within a few hours.

7. **Sour.** Sour milk will have a malty odor and will be found when poorly cooled milk results in excessive bacterial growth. It also may result from bacterial growth due to insanitary milking practices and/ or insanitary equipment. Good sound sanitary practices and prompt cooling in the bulk tank will prevent this problem.

8. **Weedy.** The weedy odor is not included among the usual feed odors. It may include obnoxious odors resembling such plants as ragweed, bitterweed, or peppergrass, and may become a very troublesome flavor

defect, It can be eliminated or minimized by keeping cows away from weed-infested pastures or by not offering feeds containing such weeds until after the cow is milked.

### **Checking for Odors**

The odors gather just below the cover of the bulk tank. To properly check for off-odor, remove a small port opening, put your nose down to the opening and smell the milk. Never open the entire lid; this will let the odors escape into the air. The detection of off-odors can be affected by a number of external factors. The hauler should strive to eliminate these factors:

1. Milk house odors.
2. Gasoline fumes adhering to clothing.
3. Smoking immediately prior to checking for odors or smoking in the milk house.
4. Eating or chewing aromatic candy, tobacco, medicine, beverages, foods, etc.
5. Highly scented shaving lotion, soap, and other toiletries on the hauler.

### **Appearance**

Following are some milk quality problems which may become evident while checking for appearance. Any of these defects would be sufficient reason to reject the tank of milk.

1. **Bloody Milk** The milk from mastitic cows may contain blood. A small amount of bloody milk can give a large quantity of normal milk a reddish tinge.
2. **Flaky Milk.** Milk from cows having mastitis may show light flakiness or pronounced stringy curd particles.
3. **Extraneous Matter.** Floating extraneous matter includes such things as insects, hair, chaff, and straw. The presence of extraneous matter may result from careless handling of milk, open doors, torn screens, dusty feeding conditions, and improper cleaning of the udder before milking.

Other problems which may become evident while checking for appearance include frozen and partially churned milkfat. These problems, depending on their severity, may or may not be reasons for rejecting the milk.

### **Checking for Appearance**

Normal milk color ranges from bluish white to golden yellow and is free from all foreign or clotted matter. When you are checking the appearance of a bulk tank of milk, make sure the tank light is on and/or the area is well lighted. Lift the lid and observe the complete, undisturbed milk surface. Any evidence of partially churned butterfat, frozen milk, or other conditions which may alter the reliability of your



sample, should be indicated on the sample container to inform the lab. Bring this to the attention of the producer and notify the fieldman to have this problem corrected.

Archival copy. For current information, see the OSU Extension Catalog: <https://catalog.extension.oregonstate.edu/em8986>

### VIII. **Measuring the Milk**

The milk shall be completely motionless when measurements are made. If the agitator is running when you arrive, it may be easier for you to sample before shutting off the agitator.

Turn the agitator switch to off, to make sure the agitator doesn't start while you are measuring. Wait at least 5 minutes for the milk to become completely motionless.

#### **Preparation of the Measuring Stick**

The essential steps to assure an accurate measurement of the milk volume are:

1. The measuring stick must be clean, dry, and free of fat. It also must be warmed to room temperature (65-70°F) before the milk is measured. The measuring stick should be stored in the bulk tank in its proper position between readings. To prepare the stick, rinse with cold water, then warm to room temperature with warm water, finally, wipe dry with a clean, dry single service paper towel. A measuring stick prepared in this manner will give you an accurate reading.

2. Now the stick is ready to be positioned into the milk. If there is any foam, gently move the foam away from the measurement area with the end of the measuring stick. Then lower it slowly into the milk until it reaches a point approximately 1/4 inch from its proper position. Wait a few seconds, then gently lower the rod till it seats itself naturally.

3. Remove the stick and read at once. The markings should be read at eye level and in a well lighted area. Make at least 2 readings to insure the correct weight is obtained. The measuring stick is graduated into 1/32 of an inch. Each graduation is equivalent to a determined number of pounds of milk posted on a conversion chart specifically calibrated for each tank. The serial number of the bulk tank, measuring stick, and conversion chart must be the same.

When the milk line is close to but not exactly on a specific mark, it is read as if it were exactly on that mark. When the milk line falls exactly between two marks, always read to the nearest even number. It is important to always read the stick in this manner to avoid inaccurate results. Immediately record the reading on the weight ticket.

The farm bulk tank and its calibration is the responsibility of the producer under the supervision of the plant and State regulatory agency. However, there are conditions that the hauler should be aware of that could contribute to inaccurate weight problems.

- a. The tank is incorrectly calibrated.
- b. Errors in the weight conversion chart.
- c. Bulk tank is out of level.

- d. Heaving, cracking, or settling of milk house floor causing the bulk tank to shift.
- e. Improper footings under the tank legs.
- f. A weaving or distortion of the measuring stick bracket or seat.

If you notice any discrepancies, you should contact the plant or plant fieldman and have them investigate the problem.

### **IX.      Correct Agitation Time**

In order to obtain a sample that is truly representative of the milk in the tank, proper agitation must be accomplished.

A general rule is five minutes of constant agitation (or more if determined by testing) for a 100 to 900 gallon tank; and for a tank of 1,000 gallons or more, constant agitation for at least 10 minutes (or more if determined by testing).

The proper agitation time should be determined by the fieldman. He should have taken sufficient samples to insure that the milk in all areas of the tank is completely mixed during the specified time.

Check your watch or timing device when you turn on the agitator. If the agitator is running when you arrive, start the timing then.

### **X.      Temperature**

The hauler should take and record the temperature of milk at each pick-up. Temperature determinations provide much useful quality control information for both the producer and the receiving plant

1. All bulk tanks shall cool the milk to a blend temperature of less than 50°F. It is recommended that milk should be cooled to less than 40°F for the production of quality milk.

2. The reading and recording of the temperature will provide a history of the bulk tank efficiency. If the temperature readings of milk in the tank gradually increase, it will show the hauler that the tank is not cooling properly. Contact the producer and the plant to resolve the problem.

3. A high milk temperature can be a warning that the milk may have an off-flavor or be high in bacteria.

4. Check the thermometer on the bulk tank, and inform the producer if the thermometer is incorrect.

A metal stem dial thermometer is recommended. Glass mercury thermometers, although more accurate, are not recommended because of the danger of breakage during use.

The thermometer should have a stainless steel stem, an unbreakable plastic window, and have an external adjustment for calibration. The thermometer must include the normal temperature of milk range. A dial range of 25°F to 125°F is recommended.

The accuracy of the thermometer should be checked before initial use and at least monthly thereafter. The best way to check the thermometer is against an officially calibrated thermometer in a 32-40°F liquid in the plant laboratory.

Be sure to sanitize the thermometer stem in 100 p.p.m. chlorine or its equivalent each time before checking the temperature of the milk..

## XI. Sampling Plans

The sampling of milk from a farm bulk tank is an important part of a hauler's responsibilities. Regardless of the sampling plan used, extreme care should be taken to obtain a representative sample.

**A. Universal Sampling Plan** A sampling plan that has become very popular is the Universal Sampling Plan. The true Universal Sampling Plan provides one sample that can be used for all laboratory analysis but not all analyses need necessarily be done on the same sample. This plan eliminates the need for the hauler to collect several types of samples and simplifies the sampling equipment necessary. It also enables the laboratory to monitor the producer's quality without requesting special samples from the hauler.

The producer is unable to anticipate when bacteria or sediment tests are to be run because the same size sample is removed from his tank at every pick-up. The universal sample of 1, 2, or 4 oz. also requires less milk, so, consequently, less milk is wasted.

**B. Sampling for a Specific Test** An alternate type of sampling plan requires that only a fat sample be taken daily. This sample, when returned to the plant, can be either tested daily as a fresh fat sample, or a portion of the sample can be placed in a bottle to be composited with samples taken on other days. The composite sample will be tested for fat at a later date. The composite bottle must not leave the plant.

The laboratory will periodically request additional samples for bacteria, sediment, antibiotics, or other desired tests. The laboratory will inform the hauler and the hauler is then required to sample for the tests requested.

This method requires that a hauler differ his sampling technique to suit the test required. For example, when sampling for fat, a sterile sample container is not needed, however, when sampling for bacteria count, a sterile container is required. When sampling for sediment, a 16 oz. (pint) sample may be needed instead of a smaller sample.

## XII. Sampling the Milk

The proper analysis of a sample is dependent upon the reliability of the sampling procedure. To be satisfactory, the sample must be

Representative and the sampling procedure must be done in a manner to prevent contamination of the sample.

This sampling procedure should be strictly followed:

1. Wash and dry your hands.
2. Identify each sample container with the producer number, the date of pick—up, and the route number.
3. Make sure the tank is properly agitated. (See Section I.)
4. If a dipper is used, make sure it is clean and has been properly sanitized in a 100 p.p.m. chlorine solution or other equally suitable sanitizing solution. The sampling device should remain in the solution until it is removed to sample the milk. Do not remove the sampling device prior to entering the milk house.  

If the dipper is stored and maintained at the farm, make sure it is clean and properly sanitized before sampling the milk.
5. Open the sample container being careful not to contaminate the interior of the container and/or its cap. Contamination of the sample container will alter the laboratory results and possibly reduce the producer's payment. Do not dip the sample container in the milk.
6. Rinse the sampling device twice in the milk before taking the sample, being careful not to put your hands in the milk.
7. Sample the milk in the tank making sure the sample container is not held over the milk supply while pouring the sample. The sample container should not be filled more than three fourths full. This will enable the laboratory to properly mix the sample before testing.
8. Properly close the sample container, making sure it is sealed correctly so that it does not leak or puncture the sample container. When using a whirl—pak bag, make sure enough air is trapped inside the bag to properly agitate the sample.
9. Immediately place the sample in the refrigerated sample case and keep it at 32 to 40°F until delivery. Provide a method, such as the use of racks or drainage holes in the sample case, to keep the sample free from contamination due to melting ice.
10. After you have sampled the milk, rinse the sample dipper with tap water and return it to the sanitizing solution.
11. Always take a second sample of milk at the first stop as a temperature reference sample. Upon returning to the plant, check and record the temperature of this sample when the samples are delivered.

**XIII. Sani-Guide Discs**

The use of sani-guide discs will emphasize the importance of clean milk. The disc will show coarse sediment (flies, hair, straw, etc.) in a bulk tank of milk.

A new sani-guide disc is placed between the bulk tank valve and the transfer hose at each pick-up. When you finish pumping the milk, examine the disc and notify the producer and the fieldman if excessive visible contamination is evident on the disc.

The sani-guide disc should be left at the farm for the producer to see and become aware of any contamination problems.

**XIV. Connection of Hose**

The transfer hose should be brought into the milkroom through the hoseport. Remove the cap from the bulk tank outlet and sanitize the tank outlet before connecting the transfer hose. Then remove the cap from the transfer hose and connect it to the bulk tank valve outlet.

The only time the transfer hose is not capped is during loading and cleaning. If there is any evidence of the bulk tank valve leaking, notify the producer and the fieldman to correct this.

**XV. Pumping the Milk**

To aid in the removal of butterfat that may have clung to the side of the tank and to help protect the plant against a fat loss due to this factor, it is a good practice to leave the agitator running until the tank is at least half empty. Make sure the agitator is shut off before foaming or splashing begins to prevent product loss due to foam.

It is also important to shut off the pump as soon as possible after the tank is empty to avoid sucking air and milk house odors into the truck tank. When the tank is empty, shut off the refrigeration compressor on a direct expansion tank or the water circulation pump on an ice bank tank.

Never leave a farm bulk tank partially full. If the tank has not completely emptied when your truck tank is full, return to the farm and empty the tank before the producer adds any additional milk. If not emptied, the bulk tank could not be washed and sanitized before the next milking, nor would the samples and weight accurately represent the milk delivered.

Do not start rinsing the tank while the hose is still attached.

**XVI. Disconnect the Hose and Rinse the Farm Bulk Tank**

After the milk is pumped from the tank, and the pump shut off, remove the hose and cap immediately. Visually check the bottom of the

bulk tank for sediment. If it is excessive, make note of it and notify the producer and plant fieldman.

As a help to the producer, rinse the interior of the bulk tank with warm water (about 110°F). This will make it easier for the producer to clean up. Close the tank covers after rinsing to prevent the tank from drying out and keep out any foreign material.

Rinse the floor down to keep it clean and free of milk. Any milk remaining on the floor will sour and develop acid which will eventually erode the concrete.

### **XVII. Recording Results**

To avoid error, promptly record all results. Each of the following results should be included on your bulk milk receipt:

1. Date of collection.
- Z. Time of pick-up.
3. Producer name.
4. Plant number.
5. Milk quality - odor and appearance.
6. Milk temperature.
7. Measuring stick reading.
8. Converted weight (milk weight).
9. Name of buyer.
10. Hauler signature.

### **XVIII. Final Farm Check**

Before you leave the milkhouse, make note of any abnormalities to report to the producer and/or plant fieldman. Note the general condition of the milkhouse, its construction, and any situations which may cause contamination of product or incorrect results in performing your job.

Samples shall be taken of all milk, even if it is rejected or frozen. Any off-condition milk should be noted for the laboratory.

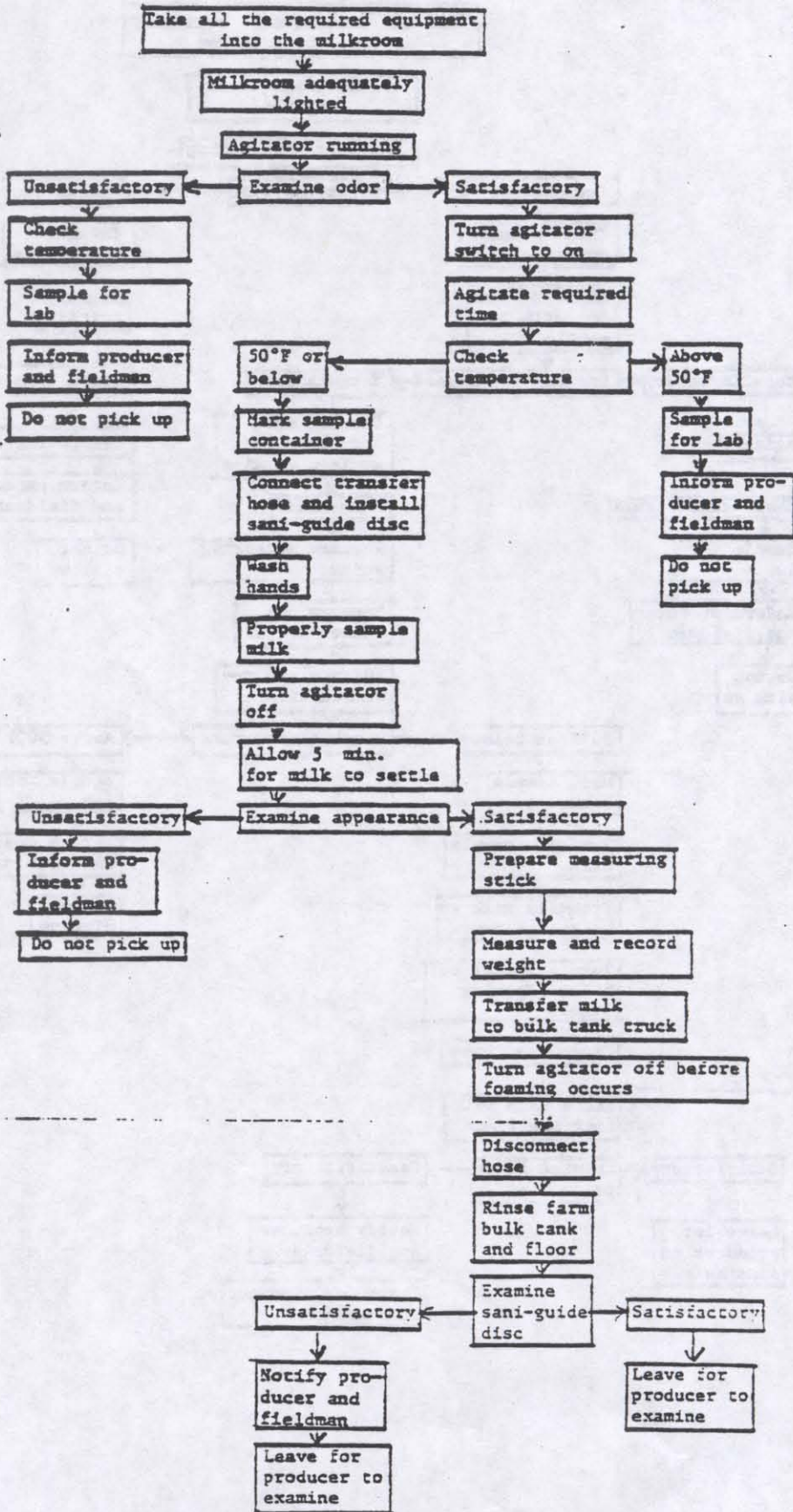
Before you leave, make sure the milkroom is in as good or better shape than when you arrived. Rinse the floor, hang up the hose, and turn the lights out.

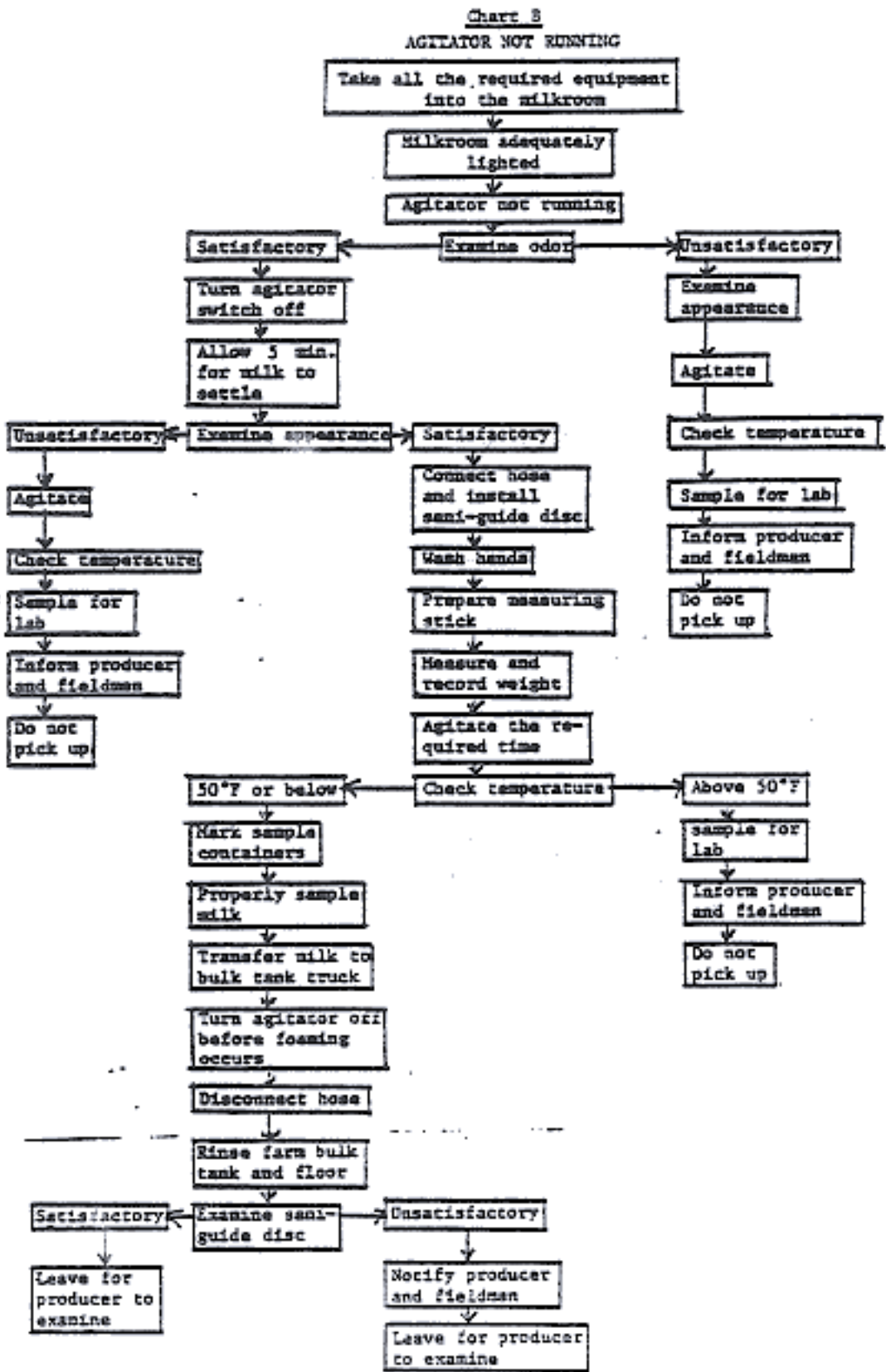
### **XIX Recap of Proper Procedures**

As you do your job, mentally use one of the following charts. If the agitator is running as you enter the milkroom, follow Chart A. If it is not, use Chart B.

Chart A

AGITATOR RUNNING







## XX. Composition of Milk

A general knowledge of the composition of milk will prove useful in the hauler's contact with producers. The main constituents of milk are water, milkfat, protein, lactose (milk sugar), and ash.

The average composition of milk is:

Water	87.0%
Milkfat	4.0%
Lactose	5.0%
Protein	3.3%
Ash	0.7%

### Causes of milkfat variations

The variation in the percent of milkfat has the greatest effect on the producers returns. The bulk milk hauler must provide an adequately mixed, reliable sample for milkfat analysis. This is done by following the proper sampling procedure outlined in this manual. There are, however, some reasons for milkfat variations which the hauler cannot control. These variations are commonly due to:

1. Breed of cow.
2. Age of cow.
3. Genetic potential of individual cows.
4. Stage of lactation.
5. Seasonal changes.
6. Udder infection.
7. Type and quality of feed.
8. Milking procedure.
9. Health of cow.
10. Heat periods.
11. Excitement.

## XXI. Milk Quality

Often times the hauler will be asked by farmers about the quality tests performed by the laboratory. The following summary will help him explain the reasons for the tests and his responsibilities as the official sampler.

### A. Milkfat

The results obtained from the fat tests are the basis for payment to the producer for his milk. It is important that the bulk milk hauler has a knowledge of the proper procedure to insure that this test is accurate and representative of all the milk in the farm bulk tank.

The Babcock, Gerber, and Milk-O-Tester are the common tests used for determining milkfat.

### **B. Bacteria Count**

Bacteria are microscopic one-celled organisms which are found on and in all living animals, in the soil, water, ponds, and even wells. Manure, flies, insects, rodents, utensils, and equipment are sources of many types of harmful bacteria. Because of the widespread presence of bacteria, contamination of equipment which comes in contact with milk must be avoided.

The amount and kind of bacteria found in a sample of milk is an indication of the sanitary conditions and practices occurring on the farm and the extent of milk cooling. Contamination can occur when measuring, sampling, and transferring milk. Therefore, extreme care must be taken to prevent further contamination due to the hauler.

### **C. Inhibitor Test**

The presence of antibiotic residues can cause violent allergic reactions in some individuals. These residues are of medicine and drugs used to treat the milking animals for udder or other infections. Therefore, tests are run periodically to determine their presence in milk.

Excessive residues or sanitizers used on milk handling equipment will also show up in these tests.

### **D. Sediment Tests**

This is a rapid method to determine whether the milk is being properly protected from contamination due to dust, and/or improperly cleaned udders. The presence of sediment indicates insanitary methods of milking and milk handling practices. A clean sediment disc pad, however, does not prove that sanitary practices exist.

The test consists of filtering a sample of milk through a white cotton disc and checking the amount and kind of residue left.

### **E. Added Water**

The temperature at which milk will freeze is a fairly constant factor and can easily be determined by laboratory tests. If water is added either deliberately or by accident, the freezing point will become closer to that of pure water. Adding water to milk is illegal.

The hauler must exercise care and make sure the transfer hose is disconnected before the bulk tank is rinsed in order to prevent adulteration with water.

### **F. Somatic Cell Count**

Somatic cells are primarily white blood cells. Many factors influence the number of somatic cells in milk. The cow's age, production capacity, and stage of lactation influence the normal level of somatic cells in the milk. Irritation and infection of a cow's udder caused by

poor milking practices, improper cattle housing, improperly operating milking machine, or poor pasture conditions will show up as increased somatic cell counts. High somatic cell counts signify that some cows in the herd are experiencing illness or injury.

The test measures the level of white blood cells in the milk.

A level of 500,000 or less indicates normal milk and a mastitic condition would not be expected. Somatic cell counts exceeding 500,000 to 1,000,000 per ml. indicate that mastitis may be a herd or cow problem and individual cow samples should be tested to identify problem cows. Somatic cell counts exceeding 1,000,000 per ml. indicate that there is a mastitic problem and corrective action must be taken immediately. Counts exceeding 1,500,000 per ml. also indicate a severe mastitic problem and the milk should not be used for human consumption.

## XXII. Rules for Good Milking Techniques

The producer may from time to time have questions concerning mastitis. A general knowledge of good milking techniques is necessary to answer his questions. The following 10 rules will aid in the prevention of mastitis problems in the producer's herd.

1. Wash the udder with a warm sanitizing solution and dry with a single service paper towel.
2. Remove 2 or 3 streams of foremilk from each quarter and examine for abnormalities.
3. Attach the teat cups approximately 1 minute after starting udder preparation - or when the teats are full of milk.
4. Adjust the teat cups during milking as necessary to insure that the quarters milk out properly.
5. Start machine stripping when milk flow slows to a minimum (usually 3 to 4 minutes). Machine strip quickly. Do not overmilk.
6. Dip the teats in a teat dip proven to be safe and effective immediately after the teat cups are removed.
7. Treat all clinical cases of mastitis.
8. Treat all cows at drying off.
9. Conduct a cowside screening test such as the California Mastitis Test (CMT) at monthly intervals, and record the results for future reference.
10. Have the entire milking system analyzed twice a year by a qualified milking machine service man.

### XXIII. Sample Questions

Some sample questions are enclosed with the Bulk Milk Hauler's Manual to help prepare the applicant for the licensing examination.

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**True or False** - In the space provided following the question, place an "X" in the correct column.

	True	False
1. The Bulk Milk Hauler's license is renewable every other year.	_____	_____
2. Normal milk color ranges from bluish white to golden yellow and may contain a limited amount of foreign or clotted matter.	_____	_____
3. A milk temperature above 50°F can be a warning that the milk may have an off flavor or be high in bacteria.	_____	_____

**Fill in the blank** - In the following questions, fill in the blank with the correct word or words.

- \_\_\_\_\_ is a serious off-odor that is sufficient reason to reject a farm bulk tank of milk.
- The detection of off-odors can be affected by external factors including, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
- The correct agitation time for a 800 gallon tank is \_\_\_\_\_ minutes.

**Multiple choice** - Each question is followed by a series of answers; Check the answer or answers which are correct. More than one answer can be correct.

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1. The only time the transfer hose *is* not capped is:

- \_\_\_\_\_ a. during loading                      \_\_\_\_\_ c. while you rinse the farm bulk tank  
\_\_\_\_\_ b. between stops                      \_\_\_\_\_ d. during tank truck cleaning

2. The Somatic Cell Count determines:

- \_\_\_\_\_ a.) the level of white blood cells in the milk  
\_\_\_\_\_ b.) the percentage *of* milk fat  
\_\_\_\_\_ c.) amount of added water  
\_\_\_\_\_ d.) amount of *sediment in* the milk

3. The hauler should be aware of the following conditions which could contribute to inaccurate weight problems:

- \_\_\_\_\_ a.) tank incorrectly calibrated  
\_\_\_\_\_ b.) amount of milk in the tank  
\_\_\_\_\_ c.) improper footings under the tank legs  
\_\_\_\_\_ d.) heaving, cracking, or settling of the milk house floor causing the bulk tank to shift

## MILK RECEIVING, GRADING AND TRANSPORT

### Fact Sheet\*

The true measure of milk quality, as far as the consumer is concerned, is flavor. The quality measures used by most regulatory agencies and milk handlers are bacteria counts and sediment tests. While milk of low bacteria count and low sediment content may be of good flavor, this is not necessarily the case. For example, milk can be rancid, oxidized, or feedy even though it is relatively free of bacteria and sediment--in other words, sanitary quality and milk flavor need not be related.

Marketing experts contend that flavor is an important factor influencing the repeated purchase of food products. Until recently, primary sales efforts on dairy products have been concentrated around food value, convenience, and uses in menu planning. Milk has been promoted as "nature's most nearly perfect food" with little or no attention to billing it as "nature's best tasting food."

No one would deny that the milk hauler's job requires training, knowledge and initiative--and tact or diplomacy when it comes to those occasional dairymen, who we shall refer to as characters.

The operator of a tank truck is at once a truck driver, a sampler, a weigher, a milk quality judge and the contact man for the processor who receives the milk.

The important decision making of accepting or rejecting milk is an "all or none" business. Training and experience play a big role here.

Milk haulers must:

1. Be alert
2. Willing to take responsibility
3. Maintain day-to-day relationship with producers
4. Have integrity--measure and sample with equity
5. Have a keen sense of smell.

The decisions that are made by the hauler govern the type of milk the processor can offer consumers.

**"Milk hauler or receiver"** means a person who, in the course of his employment, accepts bulk milk or milk products from a producer, milk plant, receiving or transfer station, and transports such commodity to a milk or dairy products plant. (ORS 621.152)

**ACCEPTABLE QUALITY OF FLUID MILK.** "Acceptable quality of fluid milk" is that which is free of objectionable flavors and odors and is normal in appearance. Flavors and odors including those of obnoxious weeds which are not removed by plant processing, are objectionable for grade A use, but slight or moderate feed flavors and odors which are normally removed during the processing are not objectionable. (OAR 24-623.5)

\*Based on Oregon Agricultural Regulations (OAR) Chapter 603, dated 11/1/71

Oregon State University Cooperative Extension Service  
Oregon State Department of Agriculture, Food and Dairy Division

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**GRADING.** (1) Each shipment or pick-up of grade A fluid shall be graded as to its acceptable quality by a licensed grader. If it is not acceptable and is rejected as unfit for grade use, a record (forms supplied by the department) is to be made showing:

- (a) Producer's name and number;
- (b) Market or pooling agent;
- (c) Date and time;
- (d) Quantity; and
- (e) Cause for rejection.

(2) The original copy of the record is to be forwarded to the department, Food and Dairy Division, not later than 7 days following the rejection. (24-641. 5)

**SAMPLING PERIOD STANDARD** means the examination or testing of at least four samples of milk and milk products every six months period for compliance with standards. (24-622. 5)

**ABNORMAL MILK STANDARDS.** Compliance with the abnormal milk standards for retail raw milk for pasteurization shall be determined by examination or testing for total somatic cells (leukocyte count) of at least four samples of milk from each producer or producer-distributor every six-month period. The leukocyte count shall be determined by the Wisconsin mastitis test (W.M.T.) the direct microscopic leukocyte count (DMSCC) or any other test, which will give comparable results and is approved by the department. (24-621.5)

**EXAMINATION FOR ABNORMAL MILK.** Examination of milk and enforcement of the standard shall be as follows:

- (1) A Wisconsin mastitis test or DMSCC shall be conducted on each producers or producer-distributors raw milk at least four times in each six-month period.
- (2) A milk sample having a leukocyte count of one million or more per milliliter (ml) shall be deemed to be violative of the abnormal milk standard.
- (3) The three (3) out of five (5) compliance method shall apply in the case of all abnormal milk showing one million (1,000,000) or more leukocytes per ml. except that a period of four weeks shall be allowed between warning notice and the taking of the next official test (including a DMSCC) for enforcement purposes.
- (4) Whenever two of the last four consecutive leukocyte counts exceed the limit of the standard, the producer shall be given a warning letter that shall be in effect so long as two of the last four samples exceed the limit. An additional sample shall be taken but not before the lapse of four weeks. Immediate suspension of the milk shall be instituted whenever the standard is violated by three of the last five leukocyte counts. No action is taken if the additional sample is within the standard (less than 1,000,000 cells per ml.) Release from suspension will be made with first satisfactory sample. Milk shall be degraded whenever the standards is violated by three of the last five leukocyte counts. (24-639. 5)

**SEDIMENT TEST.** (1) If upon examination the department or grader shall obtain a sediment test which is in excess of a No. 2 sediment standard, the department shall give the licensee a written notice of such fact. An additional sample shall be taken after an interval of not less than three days and if the test of the additional sample is also in violation of the sediment standard of the licensed grade then held, the licensee shall be given a written notice to suspend the sale, exposure or offering for sale of such grade of milk for a specified content within the standard for the license grade.

(2) Milk or cream showing a sediment test in excess of a No. 3 sediment standard is deemed to be unlawful milk and the grader shall immediately affix to the container thereof a condemnation tag, which shall be in such form as the department may prescribe, and in addition thoroughly mix with that milk such harmless red food coloring matter as will prevent the same from being sold, offered or exposed for sale for human consumption in accordance with ORS 621.085. (24-634.5)

**SEDIMENT STANDARDS.** The official Oregon sediment standards for milk and cream according to the official chart adopted by the department are as follows:

Standard No. 1 - No visible sediment

Standard No. 2 - Does not exceed 0.5 mg. of sediment.

Standard No. 3 - Does not exceed 2.5 mg. of sediment.

**BACTERIAL INHIBITER TEST.** Antibiotic tests on each producer's milk or on commingled raw milk shall be conducted at least four times during any consecutive six (6) months. When commingled milk is tested, all producers shall be tested when test results on the commingled milk are positive. (24-640.5)

**GRADE A RAW MILK FOR PASTEURIZATION** is fluid milk produced by a disease-free herd on a dairy farm in conformance with all the items of sanitation (24-654.5)

Grade A raw milk for pasteurization shall at no time between transfer from the original producer container and pasteurization have an average bacteria count exceeding 160,00 per milliliter. Also the bacterial count average of fluid milk for pasteurization from individual farm bulk milk tanks shall not exceed 80,000 per milliliter, the temperature shall not exceed the average of 45° F., and the sediment content must not be in excess of a No. 2 sediment test. (24-670.5 & 24.654.5)

**MISCELLANEOUS REQUIREMENTS.** (e) The loading and unloading area used by milk tank trucks at dairy farms shall consist of a concrete platform, or slab of sufficient size in area to prevent hose or milk piping while in use from coming in contact with the ground or other such unprotected surfaces. Such platform shall be kept clean, in good repair and sloped to drain. A port of sanitary design with an approved type cover shall be provided in the wall of the milk house where a farm tank is installed for the passage of the milk hose from the tank truck to the farm tank. The port shall be kept closed except when it is in use. (24-656.05)



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**TANK TRUCKS.** (a) Each delivery container or tank used in transporting bulk raw milk or milk products for pasteurization between milk plants shall be tagged or labeled as to the name and address of distributor and grade of milk or milk products contained therein.

(b) Tank trucks used and methods employed in transportation of bulk milk from dairy farm or receiving station to a milk plant shall be subject to approval by the department. (In granting its approval, the department will take into consideration the minimum sanitary standards known as the 3A Sanitary Standards for dairy equipment established by the International Association of Milk Sanitarians, New York; U.S. Public Health Service,, and Dairy Industry Committee.

(c) All hose, piping, fittings and pumps used in transferring milk to or from tank trucks, and which are to be carried on the truck, shall be stored in a sanitary compartment designed and constructed as to exclude dust and moisture. The compartment shall be equipped with a drain properly plugged or capped to facilitate cleaning. The hose, pipe or milk pump openings shall be properly capped or plugged when not in use.

(d) All milk inlets or outlets to tank trucks shall be equipped with approved type tight fitting metal or plastic dust cap or cover. These covers shall be in place at all times except when the tank truck is being cleaned, loading or unloading milk.

(e) Milk shall be conducted to and from tank trucks only through sanitary pipes or approved type flexible tubing which complies with the requirements of section 24-656.12.

(f) Tank trucks used in taking delivery of milk from farm milk holding tanks shall be equipped with sanitary metal dust tight compartment for the storage of containers of milk sampled for bacterial analysis. The compartment shall be so constructed that the samples can be iced or otherwise refrigerated while in transit so as to maintain a temperature of 32-40 degrees F. or less while stored in the compartment.

(g) Adequate sanitary facilities shall be provided at the dairy farm, receiving station and milk plant, as the case may be, for the tank truck to load or unload fluid milk.

(h) Tank trucks shall not receive any milk from producer dairy except that stored in approved type farm bulk milk storage tanks. (24-656.09)

**UTENSILS AND EQUIPMENT--CLEANING.** All multi-use containers, equipment, tank trucks and other utensils used in the handling, storage, or transportation of milk and milk products shall be thoroughly and promptly cleaned after each usage. Exterior surfaces of such equipment shall be kept clean. (24-656.09)

Tank trucks including piping, connections, and pumps used to load and unload tanks shall be cleaned at receiving plant immediately after being emptied, or at least once daily. (24-656.10)

All vehicles used in the transportation of milk or milk products shall be kept clean and no substance capable of contaminating milk or milk products shall be transported with such milk or milk products in such manner as to permit contamination. (24-656.20)

**UTENSIL AND EQUIPMENT--BACTERICIDAL TREATMENT.** Tank trucks and other utensils used in the production, handling, storage, or transportation of fluid milk products shall after cleaning and immediately before each usage be effectively sanitized by being subjected to an approved bactericidal process. Outlet valve to farm tanks shall be capped after bactericidal treatment and while in use.

The following methods of sanitization are approved or any other method which has been demonstrated to be equally effective and is approved by the department:

- (1) Hot water at 170° F. for 5 minutes.
- (2) Steam at 170° F. for 15 minutes or steam at 200° for of 5 minutes or jet steam for not less than 1 minute.
- (3) Chemical sanitizers at minimum required strength via for at least 1 minute immersion or flow (24-656. 11)

**PERSONNEL-CLEANLINESS AND HEALTH.** (1) Hands shall be washed clean and dried with an individual sanitary towel immediately before milking, before performing any milk house function, and immediately after the interruption of any of these activities. Milkers and milk haulers shall wear clean outer garments while milking or handling milk, milk containers, utensils, or equipment. No person with an infected cut or lesion on the hands shall milk cows or handle milk utensils.

(2) All milkers and handlers of milk and milk products shall be free of communicable diseases which may be transmitted through milk and milk products and may be required to take such physical examinations as the department may direct.

**COOLING** (2) In the case of raw milk for pasteurization, milk must be cooled by an approved method to 45° F. or less within two hours after milking and maintained at that temperature until delivered. (24-656.19)

**PROTECTION FROM CONTAMINATION.** Suitable filters to the manholes of transport tanks during unloading shall be required; filtering equipment shall be stored off floor in a sanitary manner when not in use.

(3) Whenever air under pressure is used for the agitation or movement of milk, or is directed at a milk-contact surface, it shall be free of oil, dust, rust, excessive moisture, extraneous at materials, and odor. The use of steam containing toxic substances is prohibited. Whenever steam is used in contact with milk or milk products, it shall be of culinary quality. (24-674.15)

**TAGGING AND COLORING UNLAWFUL MILK OR CREAM.** (1) Whenever a grader determines that any milk or cream is unlawful, he shall immediately affix to its container a condemnation tag. Condemnation tags shall be in such form as prescribed by the department. The grader shall also thoroughly mix with the condemned milk or cream some harmless coloring matter.

(2) As used in this section the term "unlawful milk or cream" means:

(a) Milk or cream which contains dirt, filth, oil or other foreign matter which may render them, or dairy products from them, unfit for human consumption.

(b) Milk or cream which is stale, cheesy, rancid, putrid, decomposed or actively foaming.

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(c) Milk or cream which contains an unreasonable amount of sediment of any kind.  
(ORS 621. 226)

**LICENSES FOR MILK SAMPLER AND GRADERS, AND PASTEURIZER OPERATORS. (1)**

All applications for a license as a milk sampler and grader, or pasteurizer operator shall be made to the department on forms provided by it. Any licenses issued by the department under this section may be restricted in their application to the person licensed so as to authorize the holder to engage only in a limited line of activity commensurate with the holder's ability.

(2) The applicant shall be required to pass a reasonable written examination and give a practical demonstration of his ability to carry out the duties required under the license. [621.072 (2)] Each application for a license shall be accompanied by a fee of:

- (a) Milk sampler and graders, \$25.
- (b) Pasteurizer operators, \$25.

(3) The fee shall not be refunded for any reason. The Pasteurizer operator license shall be valid for the lifetime of the person to whom it is issued, except as provided in ORS 621.276. (ORS 621.266).

(4) The milk sampler and grader license expires on June 30 next following the date of issuance unless sooner revoked and may be renewed upon application of the licensee. [621.072 (4)]

**LICENSEES UNDER ORS 621.266 TO SHOW KNOWLEDGE OF AND ABILITY TO COMPLY WITH CHANGES IN LAWS OR REGULATIONS. (1)** When any amendment is made in the laws of this state or new regulations are promulgated relating to a change in the grades of milk and cream or the operation of pasteurizing equipment. The department may require any person licensed under ORS 621.266 to demonstrate his knowledge and familiarity with such amendments or changes if this is not accomplished within a specified time, the license to sample and grade milk and cream shall be suspended automatically. (ORS 621.276)

**LICENSE TO SAMPLE AND GRADE FLUID MILK.** Any person, or milk hauler or receiver, grading fluid milk as unfit for processing as fluid milk due to quality, odor, flavor or wholesomeness, shall first obtain a license and shall thereafter be authorized to sample and grade fluid milk as herein provided. The grader shall make a true written record of grade, the reason for rejection with the name of the producer, the date of rejection and the quantity involved. A copy of the record shall be made available to the department or other official milk inspection agency. [ORS 621.072(2)]

**SUSPENSION OR REVOCATION OF LICENSES ISSUED UNDER ORS 621.266.** If any person licensed under ORS 621.266 fails, neglects or refuses to fully and faithfully comply with any provisions of ORS 621.151 to 621.291 required of persons so licensed, his license may be revoked or suspended, or otherwise limited. (ORS 621. 281)

No licensee or licensed milk sampler and grader shall:

- (a) Negligently sample, weigh or test any milk or cream.
- (b) Fraudulently manipulate any weight, sample or test of milk or cream.
- (c) Make a false entry or record of the weight, or test of milk or cream on any statement, record or invoice. (ORS 621.286)

**SALE OR POSSESSION OF MILK OR CREAM TO WHICH WATER HAS BEEN ADDED.** No producer, producer—distributor, distributor, or nonprocessing distributor as defined by ORS 621.055, or licensee as defined by ORS 621.152, or a dairyman who produces and sells milk for manufacturing purposes, his employee or agent shall offer or expose for sale, sell, exchange or deliver to any person, the retail trade or other places or have in his possession or under his control, with the intent to

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sell, expose, deliver, purchase for resale or receive for manufacture any milk or cream to which water has been added, as evidenced by official department laboratory test, except as may be permitted by the department in (1) the reconstitution of fluid milk from dried milk solids or (2) the transportation of the product containing added water to a dairy products plant, as defined in ORS 621.152 for recovery of the milk food solids. (ORS 621.088)

**ADULTERATED-BACTERIAL INHIBITER STANDARD.** The antibiotic test standard shall be deemed to be met providing the sample(s) of milk and milk product when examined and/or tested shows a negative reaction (not inhibiting bacterial growth as determined by the disk assay method or any other test approved by the department. Enforcement authority is under the Oregon Food Act ORS 616.235. (24-617.5)

**WHAT FOOD DEEMED ADULTERATED.** A food shall be deemed to be adulterated:

(1) (a) If it bears or contains any poisonous or deleterious substance which may render it injurious to health.

(h) If it is milk drawn from cows within 15 days next before and five days after parturition, or from cows fed on unwholesome food. (ORS 616.235)

**PRODUCER MILK FLAVOR CHART**  
**Increase Milk Sales with Flavor Control**  
**Milk of good flavor has a pleasant, slightly sweet taste and odor**

Off-flavor	Possible Causes	Prevention
OXIDIZED cardboardy	Exposure to "white metal" worn tinned, or rusty surfaces on milk-handling equipment  Winter or dry lot feeding  Exposure to daylight or artificial light  Copper or iron in water supply	Use stainless steel, glass, plastic or rubber on all milk contact surfaces  Provide green feed  Protect from artificial light/daylight  Water treatment may be necessary
RANCID bitter soapy	Late lactation (over 10 months) or low producing cows  Excessive agitation or foaming of raw milk  High blend temperatures	Discard milk from low producing or late lactation cows  Keep fittings tight and air admission to a minimum  Cool milk to at least 40° F and hold
FEED CR WEED unnaturally sweet aromatic	Eating or inhaling odors of, strong feeds (grass or corn silage, green forage, wild anion, or other weeds) prior to milking  Sudden feed changes	Feed after milking, ventilate barn, withhold objectionable feed or remove cows from pasture 2 to 4 hrs. prior to milking, store silage carts out of barn
FEED CR WEED unnaturally sweet aromatic	Eating or inhaling odors of, strong feeds (grass or corn silage, green forage, wild anion, or other weeds) prior to milking  Sudden feed changes	Feed after milking, ventilate barn, withhold objectionable feed or remove cows from pasture 2 to 4 hrs. prior to milking, store silage carts out of barn
UNCLEAN barny cowy	Damp, poorly ventilated barns  Dirty cows or barn Dirty milk-handling equipment  Improper preparation and milling  Cows with Ketosis (Acetonemia)	Keep barns clean and well ventilated  Clean cows Clean/sanitize all milk-handling equipment  Wash and dry cow's udder prior to milking; handle milker to avoid sucking up bedding  Withhold milk, treat cows
MALTY OR HIGH ACID grapenut-like sour	Dirty milk-handling equipment  Slow or insufficient cooling	Clean milk-handling equipment after each use, Sanitize milk-kindling equipment prior to use  Promptly cool milk to 40° F and hold
OTHER OFF-FLAVORS medicinal  disinfectant  salty  flat	Medication, insecticides  Certain disinfecting or sanitizing agents  Mastitis, late lactation cows  Low total solids	Use according to directions Use odorless medication  Avoid strong smelling disinfectants, use sanitizers properly  Discard milk  Evaluate feeding program Thoroughly drain equipment before use

**FLAVORS TRANSMITTED TO MILK IN RELATION TO THE  
QUANTITY OF FOOD AND THE LENGTH OF INTERVAL PRIO TO MILKING**

<b>NO.</b>	<b>FEED</b>	<b>AMOUNT OF FEED (LBS)</b>	<b>INTERVAL BEFORE MILKING (HRS)</b>	<b>FLAVOR OF RESULTING MILK</b>
1	Alfalfa hay	2-6	2	Objectionable feed
2	Alfalfa hay	2-6	4	Occasional feed
3	Alfalfa hay	2-6	5	No criticism
4	Alfalfa silage	5	1	Definite feed
5	Alfalfa silage	15-25	11	No criticism
6	Clover hay	6	2	Pronounced feed
7	Clover hay	15-20	11	No criticism
8	Clover silage	5	1	Definite feed
9	Clover silage	15-20	11	No criticism
10	Green corn	25	1	Slight feed
11	Green corn	25	11	No criticism
12	Dry beet pulp	7		Slight feed
13	Oat hay	12	2	No criticism

Accepted from data of R.R. Hedrick, Montana State College, Bozeman, Montana

bm1130-R380

## VAT PASTEURIZATION

**PURPOSE:** To understand the basic principles, and public health reasons for the requirements of proper design and operation of a batch type or vat pasteurizer.

### OBJECTIVES:

- To understand and be able to list and explain the compliance and construction requirements of a vat pasteurizer.
- To list the correct operational methods of a vat pasteurizer.
- To be able to describe and perform all required regulatory tests for a vat pasteurizer.
- Know and be able to list the CRITICAL CONTROL POINTS of a vat pasteurizer.

### GENERAL DISCUSSION

The heating of milk in a vessel has long been one of the most effective methods of rendering a relatively organism free and hopefully pathogen free milk product.

The product is heated in a **jacketed stainless steel vat** which has been fitted with water and steam to the jacket liner, **thermometers** to monitor and record product temperatures, and some means of **agitation** to assure uniformity in temperature distribution. Other requirements include properly designed valves, time/temperature requirements, and methods of operation, which will be discussed in this chapter.

Generally, we can say that all vat or batch type pasteurizers should conform to "**The 3-A Sanitary Standards for Non-Coil Type Batch Pasteurizers For Milk and Milk Products**", **Number 24-01**. This standard provides guidelines for the installation, approved materials, finish, and fabrication of vat pasteurizers. Also all vat pasteurizers must comply with Item 16p(A) of the PMO, including all operational and construction requirements.

## **VAT PASTEURIZATION**

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### **VAT PASTEURIZATION-CRITICAL CONTROL POINTS**

✓ ***TIME AND TEMPERATURE REQUIREMENTS MET***

✓ ***NO TEMPERATURE ABUSE***

✓ ***COVERS IN PLACE DURING OPERATION***

✓ ***VAT CONSTRUCTION WITHIN COMPLIANCE***

✓ ***AGITATION DURING OPERATION***

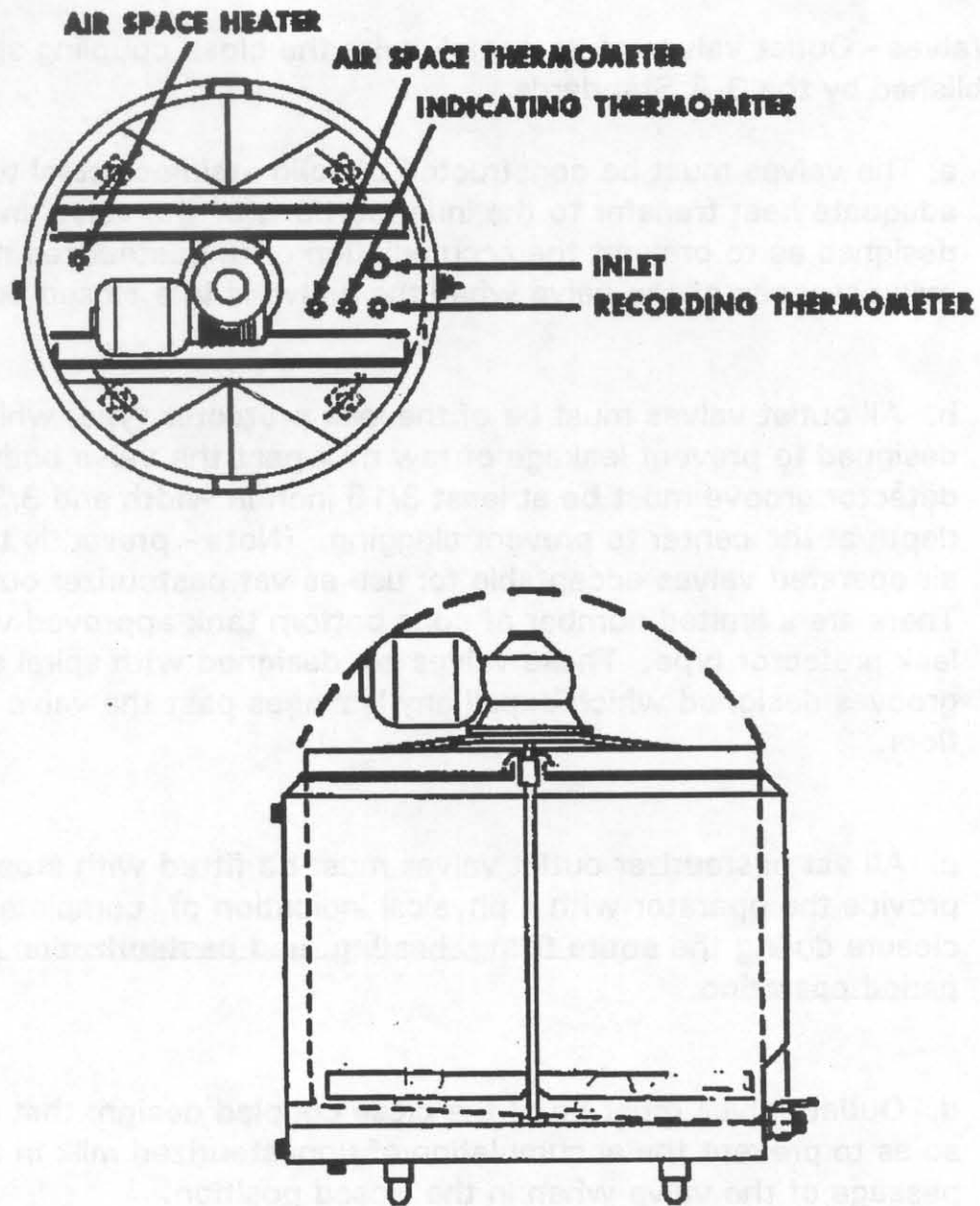
✓ ***NO INGREDIENTS ADDED AFTER PASTEURIZATION***

✓ ***PRODUCT PROTECTED AFTER PASTEURIZATION***



## VAT PASTEURIZATION

Figure 1  
Schematic  
of a Vat  
Pasteurizer



## VAT PASTEURIZATION

### ***BATCH PASTEURIZER CONSTRUCTION STANDARDS***

- 1) **Valves** - Outlet valves must comply with the close coupling standards established by the 3-A Standards.
  - a) The valves must be constructed of **solid stainless steel** to permit adequate heat transfer to the inner portions of the valve and so designed as to prevent the accumulation of unpasteurized milk in the milk passages of the valve when the valve is in a closed position.
  - b) All outlet valves must be of the **leak protector type**, which are designed to prevent leakage of raw milk past the valve body. The leak detector groove must be at least 3/16 inch in width and 3/32 minimum depth at the center to prevent clogging. (Note - presently there are no air-operated valves acceptable for use as vat pasteurizer outlet valves). There are a limited number of cone bottom tank approved valves of the leak protector type. These valves are designed with spiral shaped. grooves designed which expel! any leakages past the valve seat to the floor.
  - c) All vat pasteurizer outlet valves must be fitted with **stops** which provide the operator with a physical indication of complete valve closure during the **entire filling, heating, and pasteurization holding period operation.**
  - d) Outlet valves must be of the **close-coupled** design; that is, designed so as to prevent the accumulation of unpasteurized milk in the milk passage of the valve when in the closed position.
  - e) All vats used for pasteurization must be fitted with adequate means of **continuous mechanical agitation.**

- f. The requirements outlined in Ma-76 prohibits the practice of leaving the raw milk fill line to remain in place in the vat pasteurizer during the holding time phase since this interpretation memoranda requires the complete separation between raw and pasteurized milk product at all times.
- g. Outlet valves which are mounted vertically, as on cone bottom vats, must have a leak detector groove arrangement which will allow free drainage of any product past the plug while in the closed position. Grooves must be curved or placed at such an angle to accomplish proper draining. Diagrams of these valves may be found in the 3-A Standard 08-17, Part 2, drawings 100-28 and 100-29.

### IMPORTANCE OF PROPER STOPS ON PLUG VALVES

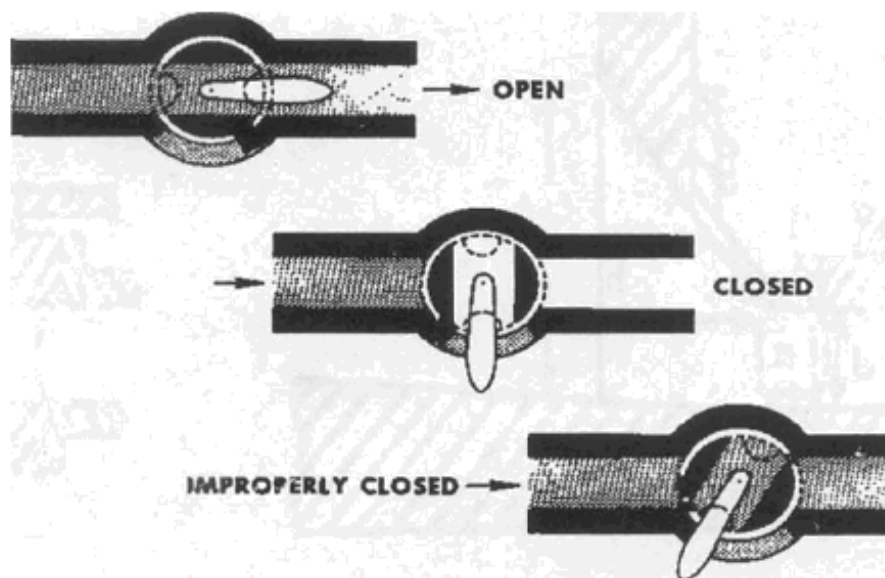


Figure 2

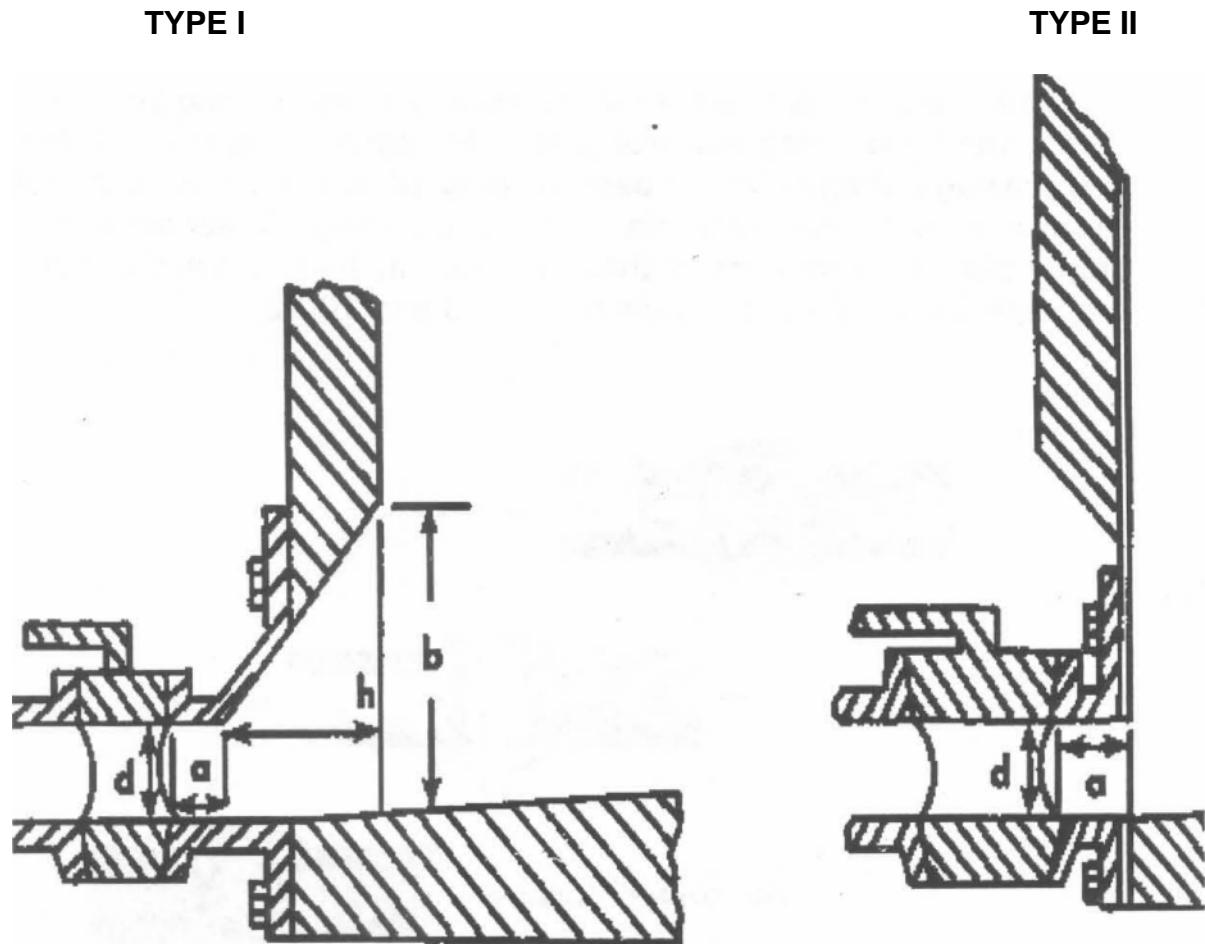
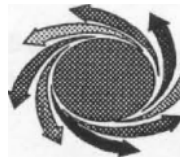


Figure 3  
Close Coupled Outlet Valves

## 2. Covers

- a. All openings must be provided with **covers constructed to prevent the entrance of surface contamination or foreign material**. The main cover or lid shall be designed to remain in the open position (to facilitate processing and/or cleaning), and shall be sufficiently rigid and self draining. The main lid shall be designed so that raising will not allow any liquid or other contamination to enter the pasteurizer.
- b. Openings in the tank or vat cover must be equipped with raised edges to prevent surface drainage into the milk.
- c. The vat cover and any opening into the tank interior must have overlapping or "shoe box" type edges. The covers must be relatively close fitting and overlap the opening.
- d. All pipe, thermometer, agitator shafts, or other appurtences that extend down into the vat must do so only through condensation diverting aprons unless a water tight joint is used.


## 3. Agitators



- a. All vats used for pasteurization **must be equipped with a mechanical means** of assuring that each and every particle of milk is heated. This is accomplished by **mechanical/electrical motor driven agitators**. The most efficient agitators will be designed to push the product down and sweep the product across the heat exchange surface on the sides and bottom of the vat. Agitators shall be designed to result in uniform product and temperature throughout the vat. Product temperatures variances **must not exceed 1°F** between any two points within the vat at any time during the holding period.
- b. Agitators must meet construction criteria for **milk contact surfaces** and be designed to be easily cleanable and/or removable for manual cleaning.

- c. Agitator shafts must be fitted with **effective drip deflection shields** to prevent contamination of the milk.
- d. Agitator shaft openings shall have a minimum diameter of one inch to allow for removal and cleaning of the agitator shaft.
- e. The annular space around the agitator shaft shall be fitted with an umbrella or drip shield of sanitary design to protect against the entrance of contaminants.

#### 4. Indicating and Recording Thermometers

- a. Indicating thermometers shall be of the **mercury actuated**, direct-reading type, scaled to a minimum of 0.625 of an inch, with a span of not less than 25 degrees F which includes the pasteurization temperature (plus or minus 5° F) and graduated in 1° F, and accurate to within 0.5° F. Provided that electronic RTD direct reading type thermometers that meet the requirements and are acceptable to FDA may be used as indicating thermometers on batch type pasteurizers. 
- b. The sensing bulb of the indicating thermometer (official thermometer) must be designed to **extend fully into the product during pasteurization**.
- c. Each vat pasteurizer must be provided with an approved **air space** thermometer. The air space thermometer must meet the same general requirements of the indicating thermometer with exception of the bulb length, degree increments, and accuracy requirements.

Archival copy. For current information, see the OSU Extension Catalog: <https://catalog.extension.oregonstate.edu/em8986>

- e. On those vats used **solely** for pasteurizing at temperatures greater than 160° F, the recording chart may be graduated in 1° C (2° F). The 1° C (2° F) increments shall be in the **150° to 170° F** range. On these type vats, the chart may be graduated in **15 minutes** for a maximum of 24 hours.

The recorder device may be either electric or spring driven.

**Required recorder chart information** (for each product batch):

1. Name of milk plant.
2. Date.
3. Signature or initials of the operator.
4. Identification of the recorder when more than one vat is used.
5. Record of holding time including empty and fill times as required.
6. Reading of air space thermometer at the beginning of the holding time.
7. Reading of indicating thermometer at an indicated point during holding time.
8. Amount and name of product represented by each batch.
9. Record of any unusual occurrences.

Charts shall be retained for 3 months.

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5. Air space heaters may be necessary to maintain minimum air space temperatures. These devices must be of sanitary design, meet all 3-A Sanitary requirements, including installation and culinary steam requirements. The air space heater must be easily demountable for cleaning (See Appendix H of the PMO, for culinary steam requirements or Figure 5 below.)

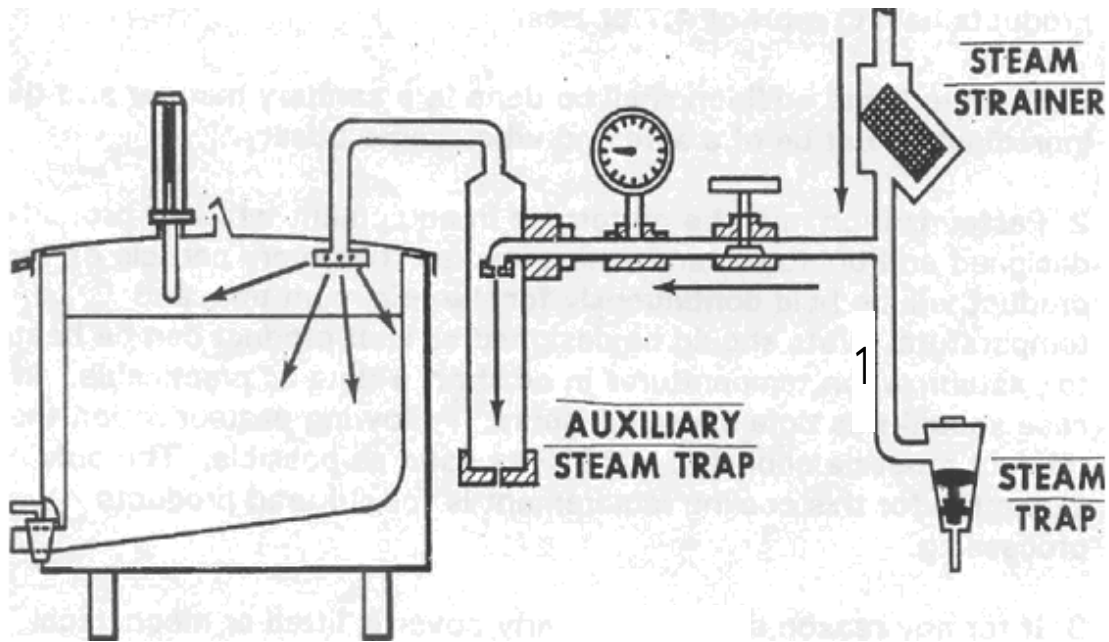


Figure 5  
Air Space Heating



## BATCH PASTEURIZER OPERATING STANDARDS

1. All product components must be added to the batch **prior to beginning the pasteurization process**. This includes any liquid sugar and sweeteners, water, milk powders and all other dairy products, flavorings, stabilizers, cocoa products, emulsifiers, and vitamins.

There are certain flavoring ingredients that may be added after pasteurization. These include flavoring ingredients having an  $a_p$  of 0.85 or less, high acid content, dry sugars, fruits and roasted nuts, safe and suitable bacterial culture organisms, and flavorings containing a high alcohol content. Fruits and vegetables may be added to cultured products having a pH of 4.7 or less.

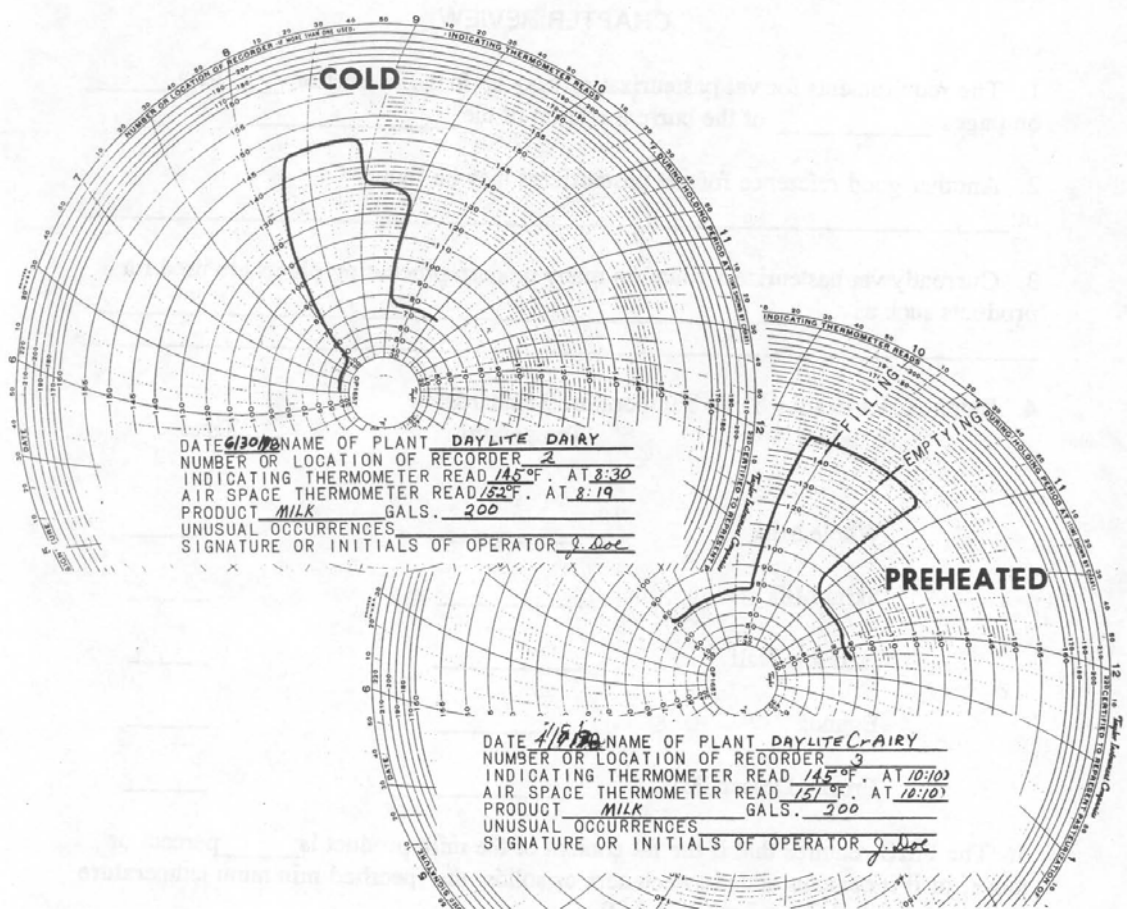
Such ingredients addition **shall be done in a sanitary manner and the ingredients must be of a safe and wholesome quality**.

2. Pasteurization must be performed in equipment which is properly designed and operated, and which insures that every particle of product will be held continuously for the minimum time and temperature. Vats should be designed so that product can be heated to pasteurization temperatures in **as short a time as practicable. In no case** should this time exceed 4 hours. Following pasteurization the product must be cooled to  $<45^{\circ}$  F as soon as possible. The only exception for this cooling requirement is for cultured products processing.
3. If for any reason the vat lid or any cover is lifted or mechanical failure of any kind (agitator malfunction, loss of temperature below the required minimum, etc) occurs after beginning of the pasteurization **cycle, the timing process must be restarted and notes to that effect must be made on the recording chart** by the operator.

4. **The official thermometer is the indicating thermometer** and the recording thermometer functions to only provide a record of the pasteurization cycle. For each product batch the operator is required to verify the accuracy of the recording thermometer using the indicating thermometer as the standard. This comparison is noted on the recording thermometer chart. **No batch of milk shall be pasteurized unless the sensors of both thermometers are covered.**
  
5. The air space thermometer reading must also be recorded on the recording chart during pasteurization. To assure that the minimum air space temperatures are being maintained, the air space indicating thermometer shall be read and recorded at the **beginning** of the holding period. It is also strongly recommended that the air space temperatures be noted and recorded **during and at the end of the holding period**. During pasteurization, the air space temperature must never be less than **5°F** above the minimum legal pasteurization temperature required for the milk product contained in the vat.
  
6. Recording charts must be used only for the length of time for which it has been designed. **Overlapping of information on circular charts is never acceptable and is a violation of the PMO. Required information on the recording chart must be legible and meet all the requirements as spelled out in the PMO.**
  
7. The outlet valve is designed to **detect and expel any leakage past the valve seat and is close coupled to prevent cold pockets of milk from accumulating in the valve or piping.**
  
8. **At no time during the pasteurization cycle or following pasteurization may the outlet piping be directly attached to any line or vessel containing raw milk or any other contaminating substance.**

## ASSURANCE OF HOLDING PERIODS

1. Vats must be operated so that every particle of milk is held for **at least 30 minutes** at or above the minimum required temperature for the specific product processed.
2. When the milk product is heated to pasteurization temperature in the vat and is partially cooled in the vat before opening the outlet valve, the recorder chart must show at least 30 minutes at or above the minimum pasteurization temperature.
3. When the milk product is **preheated** to pasteurization temperature prior to entering the vat, the recorder chart must show a holding time of 30 minutes plus the filling time of the vat **from the level of the recorder bulb sensor to the maximum level of normal operation (pasteurization)**.
4. When **cooling is begun after the outlet valve** is opened or is done entirely outside the vat, **the chart must show a holding time of 30 minutes plus the time necessary to empty the vat to the level of the recording thermometer bulb**.
5. These filling and/or emptying times must be indicated on the chart by the operator by inscribing the start and end of the official 30 minute holding time.
6. Upon close inspection, vat pasteurization recording charts used that have been used must show clearly the four identifying holes (marks), which verify the chart, has not been rotated or manually turned to give a false time line accuracy.



**FILLING AND EMPTYING TIME**

Figure 6  
Filling and Emptying Time

## CHAPTER REVIEW

1. The requirements for vat pasteurization may be found in Section \_\_\_\_\_, Item \_\_\_\_\_ on pages of the current edition of the \_\_\_\_\_.
2. Another good reference for vat pasteurizers may be found in: \_\_\_\_\_  
\_\_\_\_\_.
3. Currently vat pasteurizers found in many modern processing plants are used for products such as \_\_\_\_\_  
\_\_\_\_\_.
4. Batch Pasteurization Time Temperature Standards:

<b>Product</b>	<b>Temperature</b>	<b>Time</b>
Whole Milk	_____	_____
Skim Milk	_____	_____
Half and Half	_____	_____
Eggnog	_____	_____
Frozen Dessert Mix	_____	_____

5. The PMO requires that if the fat content of the milk product is \_\_\_\_\_ percent or more, or if it contains added sweeteners or solids, the specified minimum temperature shall be increased by \_\_\_\_\_ degrees F.
6. The FDA Dairy, Inc, vat pasteurizes their cheese milk at 173° F. The operator Mr I.M. Messed Up must always check to make sure that the air space temperature reads at least \_\_\_\_\_° F during the entire holding time.
7. What is the purpose of VALVE close coupling?

8. You are the night manager of a large milk processing plant. The vat pasteurizer operator notifies of the following:

**CONDITION****YOUR SOLUTION**

- (a) *He forgot to add dry sugar to the mix prior to pasteurization, however did add the sugar at only five minutes into the beginning of the 30 minute time and then added 25 minutes to the time after adding the sugar. The mix was packaged last night and is ready for shipment.*
- (b) *The air space thermometer was damaged and the mercury slightly separated, however since the milk was pasteurized at 170 degrees he had decided to package the product and was delivered this morning to the store.*
- (c) *The boiler lost steam pressure during pasteurization, but since the temperature never got below 145, the cream was packaged and in the plant cooler anyway.*
- (d) *Pasteurized skim was put in a processing vat, super heated, culture was added, and then pumped to the vats for cottage cheese processing.*
- (e) *The operator discovered that they had used the last vat recorder chart the previous day. HTST charts were used on the vat recorder, since the charts included the normal pasteurization temperature range used by the plant of 160 degrees F.*

9. Are any regulatory seals required on a vat pasteurizer? Y \_\_\_\_ N \_\_\_\_.

9. Provide the following vat pasteurizer thermometer criteria:

	<b>Span</b>	<b>° F Grads</b>	<b>Accuracy</b>	<b>Chart Speed</b>
<b>Indicating</b>	_____ ° F	_____ ° F	_____ ° F	NA
<b>Recording</b>	_____ ° F	_____ ° F	_____ ° F	1 rev/____hrs*
<b>Air Space</b>	_____ ° F	_____ ° F	_____ ° F	NA

For pasteurizers using temperatures greater than 160 ° F – see PMO, pages 217 –220.

	<b>Span</b>	<b>° F Grads</b>	<b>Accuracy</b>	<b>Chart Speed</b>
<b>Indicating</b>	_____ ° F	_____ ° F	_____ ° F	NA
<b>Recording</b>	_____ ° F	_____ ° F	_____ ° F	1 rev/____hrs*
<b>Air Space</b>	_____ ° F	_____ ° F	_____ ° F	NA

\*Except that strip charts may show a continuous recording over a \_\_\_\_\_ hour period.

10. List the four significant requirements for a vat pasteurizer outlet valve.

- a)
- b)
- c)
- d)

11. Explain the reasoning for the requirement that when pre-heated product is brought into a vat for pasteurizing, the filling time must be adjusted. How is this added time measured?

*Notes:*

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Published August 2009.