

VIRTUAL TOUR OF A DAIRY PROCESSING PLANT

Questions and Answers

Follow the journey of milk after it leaves the dairy farm. View a virtual tour of Guernsey Dairy, a Michigan processing plant: youtu.be/f9LYYX9URr8.



Journey of Milk

How long does it take milk to get from the dairy farm to my school?

- Milk gets from the dairy farm to your school in only 48 hours.
- Check out our Milk is Local Poster to include in your classroom! milkmeansmore.org/educational-resources/milk-is-local

Where does the milk go when it leaves the dairy farm?

- Most farmers belong to a dairy cooperative that helps them market their milk. The cooperative finds the processing plant that needs the milk. For example, the milk may travel to a plant that will make it into yogurt or the delicious chocolate milk you drink during lunch.

The farm-to-store journey:

- After a cow is milked, the milk travels through hoses and stainless-steel pipes to a large, refrigerated bulk tank.
- Along the way, the milk passes through a plate cooler. Cold water travels in one channel while the warm milk travels in another channel next to each other. Heat transfers from the milk to the water, cooling the milk. The pre-cooling process saves the energy that it takes to cool the milk. The water is recycled when given to the cows to drink at a temperature the cows prefer.

- The milk ends up in the bulk tank where compressors finish cooling the milk.
- When the milk truck driver arrives, they will test the milk to check for antibiotics.
- After a negative test, the milk truck driver connects hoses from the bulk tank to the truck.
- Milk never touches human hands throughout the process.
- The milk is loaded onto the truck from the refrigerated bulk tanks at the farm. The truck's large tank is sterilized and insulated to keep the milk clean and cold like a thermos.
- Some trucks fill up on one farm and others fill up from multiple farms.
- Truck drivers deliver the products in refrigerated trucks to area stores and distributors. The distributors deliver the products throughout Michigan and other states.

How would we know if we drink milk from farms in Michigan?

- The next time you grab milk out of your fridge, look for the five-digit code on your milk gallon. The first two digits represent the state where the milk was pasteurized and the additional three represent the dairy plant! Michigan's code is 26.
- To see where your dairy foods are from, visit whereismymilkfrom.com

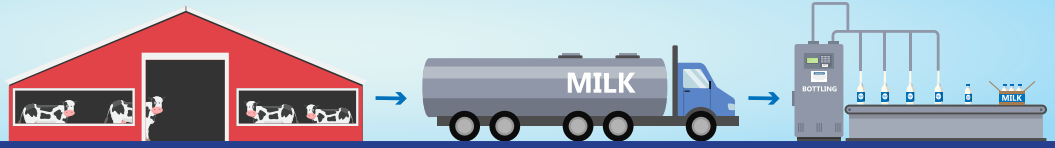
**Answers provided by Guernsey Dairy in Livonia, Michigan.*

MILK
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Visit milkmeansmore.org for more information.

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Hauling Milk

How often do the trucks pick up the milk from the farm?

- On some farms, milk is picked up every day and on other farms, every other day.

How does the milk get safely transferred into the trucks?

- After a cow is milked, the milk travels through hoses and stainless steel pipes to a large refrigerated bulk tank.
- Along the way, the milk passes through a plate cooler. Cold water travels in one channel while the warm milk travels in another channel next to each other. Heat transfers from the milk to the water, cooling the milk. The pre-cooling process saves on the energy that it takes to cool the milk. The water is recycled when given to the cows to drink at a temperature the cows prefer.
- The milk ends up in the bulk tank where compressors finish cooling the milk.
- When the milk truck driver arrives, they will test the milk to check for antibiotics.
- After a negative test, the milk truck driver connects hoses from the bulk tank to the truck.
- Milk never touches human hands throughout the process.

How does the milk truck carry all the milk?

- The milk is loaded onto the truck from the refrigerated bulk tanks at the farm. The truck's large tank is sterilized and insulated to keep the milk clean and cold like a thermos.
- Some trucks fill up on one farm and others fill up from multiple farms.

How much milk can trucks carry?

- It depends on the truck. They range from 4,000 gallons to 8,000 gallons of milk.

How does the milk stay good in the truck while traveling? Do bugs ever get through into the truck?

- The milk trucks are insulated to keep the milk cold. They are sealed to keep the milk inside and everything else out.

How many times a day or how many trucks bring milk to your processing plant?*

- It depends on the day but usually 2 times a day. During the holidays, it could be up to 3 times a day.

How much milk arrives at your plant each day?*

- 6,000-12,000 gallons a day.

Do you only use milk from 1 type of cow, or do you mix different types?

- Milk from all breeds of dairy cows is nutritious and used to create dairy foods. Some breeds have more butterfat in their milk making it the perfect milk for cheese or ice cream.

How long is the milk at your processing plant?*

- Anywhere from a few hours to 24 hours, depending on what we're making it into.

Processing

How is the milk "cleaned" or processed before selling?

- Dairy farmers, milk truck drivers and processing plant operators all follow protocols to keep milk clean, cold and safe. Once milk is at the processing plant, it is pasteurized and continues through the processing steps to be bottled as fluid milk or made into other dairy foods.

How are we 100% sure that milk is antibiotic and hormone free?

- A sample of the milk is taken at the farm to test for the presence of antibiotics in the milk. When the milk truck arrives at the processing plant, an operator takes another sample of the milk to ensure precision and accuracy.
- If the test is negative, the milk travels through tubes to the refrigerated bulk tanks.
- On an extremely rare occasion, if the milk tests positive for antibiotics, the milk is discarded and does not enter the food supply.

How do you separate the skim milk and butter fat?*

- Using centrifugal force, the skim milk is separated from the butter fat (cream). Each component is then pumped into the batch tanks.



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Processing continued

What happens in the Batching Room?*

- Different products are produced using different amounts of the skim milk and butter fat in the 3,000 gallon batch tanks. Other liquid ingredients, like chocolate, are added depending on the product that will be bottled or packaged.

Why do you put vitamins in milk? How do you put the vitamins into the milk?

- Vitamin A and Vitamin D are added to milk to fortify it with healthy nutrients.
- Vitamins are added in the batch tanks.
- Learn why Vitamin D was added to milk a century ago. usdairy.com/news-articles/why-is-vitamin-d-added-to-milk

What is pasteurization?

- Milk is heated to a certain temperature and held there for a certain amount of time. According to the Pasteurization Guidelines, milk must reach at least 161°F for at least 15 seconds. This helps ensure the safety of the milk and lengthens the shelf life.

How do you keep the milk safe for people to drink?*

- When the milk arrives, it is stored at 45°F or below.
- It travels through stainless steel pipes and is stored in stainless steel tanks, never touching human hands.
- The employees spend at least 50% of their time cleaning and sanitizing the equipment after the milk is bottled.

What happens to the milk after it goes into a container?*

- The containers of milk are placed into crates which are then transported to the cooler room. This room is kept at 35°F. The milk is stored here until it goes onto a truck for delivery.

How does the milk get to stores?

- Truck drivers deliver the products in refrigerated trucks to area stores and distributors. The distributors deliver the products throughout Michigan and other states.

How do you know when the milk is spoiled?*

- Through sensory evaluation. When milk starts to spoil, it emits a distinctive smell. Check out our milk safety brochure for more information.

How many gallons of milk do you make in a day?*

- We process 12,000 gallons of milk per day.

Do you ever run out of milk?*

- Yes, milk truck delays could happen due to changes in the farms' working schedules and staff shortages.

How do they put milk in jugs?*

- There are three different filling stations. Each one operates for a different size container. The empty gallon jug runs up a conveyer belt and goes up to a bowl full of milk that has a spigot. The gallon jug gets pressed against the spigot, and it fills the jug until it is full.

Are there additives or hormones used to process milk sold to consumers?

- When you check the ingredient list, you'll only see milk, Vitamin A and Vitamin D. Nothing else is added to white milk.

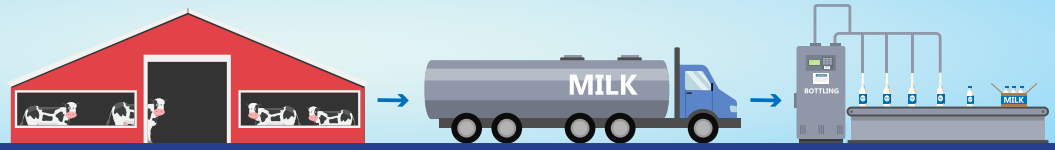
Flavored Milk

How do you make chocolate milk and other flavored milk?*

- All fluid products are blended in a 1,000-gallon mixing tank. Chocolate milk is made by adding chocolate powder and sugar to the tank containing the fluid milk.

How do you make eggnog?*

- Similar to chocolate milk, an eggnog powder base is blended with the fluid milk in the mixing tank.
- What is buttermilk?*
- Buttermilk is a cultured milk product produced by blending active cultures with fluid milk in a 1,000-gallon mixing tank.



Ice Cream

How do you make ice cream?*

- The ice cream mix is created in the batch room, pasteurized and then pumped into the ice cream room.
- The mix goes into a storage tank to go through an aging process for about 12 hours. This gives the added stabilizer an opportunity to eat up the water molecules.
- After the ice cream ages, it goes to a flavor tank where other liquid ingredients are added.
- It then has air pumped into it to help keep the ice cream scoopable.
- Next, it goes through a freezer, dropping the temperature from 35°F to 22°F.
- Additional ingredients are added that are evenly mixed throughout the whole carton.
- It then goes to the filler to fill the different size cartons.
- Finally, it is moved to the freezer room.

How long does it take to make ice cream?*

- Mix is created in the batch tanks which takes about an hour. It then travels to the ice cream room to age for 12 hours. The next day, it will take about 6 hours to run 1,000 gallons of mix, which makes 2,000 gallons of the finished ice cream product.

How cold is the ice cream freezer room?*

- The freezer room is -40°F, which helps the ice cream get to -20°F as quickly as possible.

How much milk is used to make a gallon of ice cream?*

- For a 100-gallon batch of ice cream, it takes about 85 gallons of milk and cream combined. The rest of the percentage comes from milk powder, sugar and corn syrup.

How many flavors of ice cream do you have?*

- We have 71 flavors of ice cream!

Can ice cream get too cold?*

- Unopened ice cream does not usually get exposed to temperatures below -40°F. However, once ice cream is opened, and if left open a long period of time in the freezer, it could get freezer burn which changes the texture and flavor.

Milk

How do you make 2%, 1%, and skim milk?*

- When the milk comes from the farm, it has about a 4% fat content. Fluid milk contains two components, cream and skim, that are separated. When we want to make 1% or 2% milk, cream is added to skim milk in proportion to the percentage of fat we want to have in the milk.

How do you get lactose out of milk?

- To learn more about lactose-free milk, visit thedairyalliance.com/blog/how-lactose-free-milk-is-made

How much does a gallon of milk weigh?

- A gallon of milk weighs 8.6 pounds.

Can you drink fresh milk that hasn't been processed in any way?

- We encourage everyone to enjoy the milk they purchase at school and the store. This ensures the milk has been pasteurized, kept cold throughout transportation, has vitamins A & D added and is safe to enjoy.

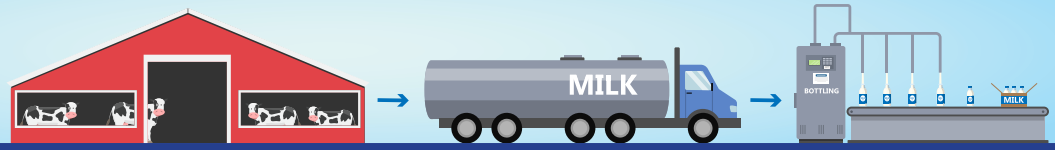
Equipment

What are the machines called that you use?*

- Separators: used to make 2%, 1%, and skim milk.
- Batching Tanks: used to make flavored milk, eggnog and ice cream.
- Fogg Fillers: used to fill milk containers.
- Half-Gallon Paper Machine (H27): used to label 27 bottles a minute.
- Quart, Half-Pint, Pint Machine (PS30): used to fill 30 bottles a minute.
- Surge Tank: used to hold surplus milk while other machines become available.
- Pasteurizer (HTST- high temperature, short time): used to eliminate pathogens and extend shelf life in milk.

Why do you have so many machines?*

- Our goal is to get milk from the tank to the milk case in the safest way possible. All our machines play an important role in making that happen.



Equipment *continued*

Why do you use stainless steel?

- Stainless steel is noncorrosive so it doesn't rust and can withstand continual cleaning and sanitizing, which is needed to keep milk safe.

What happens if some of the equipment stops working or a tube breaks?*

- Preventative maintenance is key to keeping our equipment functional.
- We also rely on back-up equipment.
- Equipment is repaired as soon as possible.

What happens if a pipe gets clogged?*

- Much of our work consists of cleaning our equipment often. Pipes are cleaned daily and it is very rare that they get clogged.

What would happen if the separator overheated while there was milk in it?*

- Our equipment has controls in place that sense if a machine is not working properly.
- The milk will be returned to the previous machine instead of continuing the processing.

How does the milk go from one machine to the others?*

- The milk travels through stainless steel pipes.
- There are valves that control which pipes the milk travels through.

Storing Milk

How do you determine the sell-by dates for milk?*

- Laboratories do shelf-life studies by taking samples of our products every day to test for bacterial growth and the presence of certain microbes. This will help us determine the sell-by date by estimating the number of bacteria that will be present in the milk days after it is processed.

Can you freeze milk and save it for later?

- Yes. It is best to thaw it out in a refrigerator. More tips for freezing milk can be found at milkmeansmore.org/10-ways-to-use-your-milk
- You can also freeze milk into ice cubes to use for smoothies

How long is milk good for after the "Sell-by" date?

- Typically, 7-10 days

Tips for storing milk

- Get milk home as soon as possible to keep it cold.
- Store it in the back of the refrigerator, not the door.
- Return milk to the refrigerator as soon as possible.
- Find more tips for storing milk at milkmeansmore.org/10-ways-to-use-your-milk

**Answers provided by Guernsey Dairy in Livonia, Michigan.*

Find additional resources on our website at :
milkmeansmore.org/schools-educators/nutrition-education

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