

QUALITY
GUARANTEED



QUALITY MANAGEMENT
IN DUTCH DAIRY



QUALITY GUARANTEED

Dutch dairy companies deliver quality dairy products 365 days a year. These companies are part of a unique quality infrastructure that spans the entire dairy chain to prevent incidents. At all stages of this chain, companies work closely together to enforce and, where possible, improve quality. Independent experts monitor every step. From “grass to glass”, every drop of milk is guaranteed for its quality and safety.

Raw materials and products are traceable across the entire chain so that when problems arise, they can be tackled quickly and effectively. Every dairy company in the Netherlands has its own quality assurance system that establishes how products and processes are handled. Farms also work with certified quality management systems. An extensive monitoring program coordinated by the Dutch Dairy Association, the trade association for the Dutch dairy industry, screens the milk from every farm.

The Dutch government monitors the quality and safety of dairy products through an inspection body specifically focused on the dairy chain: the Netherlands Controlling Authority for Milk and Milk Products (the COKZ). This agency has a great deal of expertise in the dairy sector.

The Dutch dairy sector continues to build on a long tradition of improving the quality of its products. For decades, dairy companies have worked closely with leading universities, research organizations and educational institutes. Together, they conduct research that benefits the entire chain. It is partly for this reason that Dutch dairy farmers and dairy companies are so knowledgeable and are widely recognized for their expertise.





Good milk production and quality begin with the right feed. This is an incredibly important step in the dairy chain, because proper nutrition prevents contaminants from ending up in milk.

What do cows eat?

Most Dutch cows spend the majority of the year outside in the fields eating fresh grass. The soil and climate in the Netherlands are perfect for grassland. Thanks to ample precipitation and moderate temperatures in winter and summer, grass grows well in the Netherlands. Over the decades, Dutch farmers have gained extensive knowledge in soil fertility, land use and grassland management.

In order to feed cows throughout the winter, farmers process the summer grass into silage. Silage is a preserved form of grass. To get the most out of the grass, it is mowed at a specific moment. The grass is then compacted under airtight conditions in a silo so that it

can ferment. The fermentation process and quality are monitored closely, and samples of the silage are taken periodically. The silage samples are tested for substances, such as mold or butyric acid bacteria, that could damage quality later in the dairy chain.

The quality of the silage tells farmers how to adapt rations to the amount of milk the cows produce. Synchronizing the two benefits digestion, milk production, and the health and welfare of the cow overall.

Cows drink water from ditches, spring water pumped from the ground, or water from the municipal water supply. All water sources are monitored by independent, public organizations and must adhere to tough quality requirements.

Feed concentrates

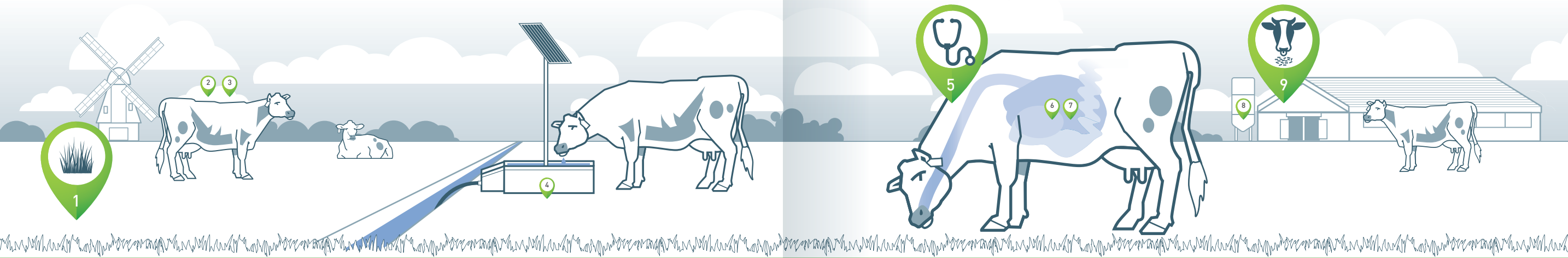
Grass and silage are staples in the cow's diet in the Netherlands. Both contain mostly protein. To optimize the cow's rations, farmers add corn and concentrates to the diet. Concentrates are small pellets produced by animal feed manufacturers which mix and compress several ingredients together, such as soy, grains, minerals and vitamins. To prevent contaminants from entering the feed, companies must comply with high quality requirements.

Assurance

The Dutch dairy chain works according to regulations set by the EU based on the General Food Law. This law establishes what can and cannot be in feed. Restrictions are set for so-called contaminants. For some contaminants, such as aflatoxins, the Dutch dairy chain's own requirements go beyond the legal ones.

Through the Netherlands Food and Consumer Product Safety Authority, the government supervises and monitors compliance with regulation. SecureFeed, an independent organization for quality in animal feed supply, monitors additional requirements. SecureFeed has developed and oversees a joint system for the monitoring and risk assessment of raw materials and their suppliers. SecureFeed's starting point is the GMP+ certificate.

In the Netherlands, dairy farmers only buy animal feed from companies associated with SecureFeed.



QUALITY MANAGEMENT ON THE FARM

- 1 The Netherlands' soil and climate are ideal for grassland. Over the decades, Dutch farmers have developed considerable knowledge and experience in grassland management.

2 As of 2016, the Netherlands has 1.63 million dairy cows at 17,500 dairy farms. All told, they produce 13.3 billion kilograms of milk per year.
- 3 Most cows in the Netherlands spend a great deal of time outside in the fields. This adds to the country's diverse and picturesque landscape. During the winter months, farmers use silage from grass and corn. This means that cows eat mostly grass and feed made on the farm.

4 In order to produce milk, cows need sufficient amounts of good quality water. Water can come from ditches, from the ground
- (spring water), or from the public water line. All three are monitored by independent agencies.

5 Good milk comes from healthy cows. Dairy farmers continuously evaluate feed intake, health, milk production and milk quality.
- 6 Considerable research is conducted across the dairy chain and by research institutes to study the optimal balance between feed rations and milk production, and the relationship between feed and health. As a result, a lot of knowledge has been developed around the digestive system, udder health and feed efficiency at various stages of lactation.

7 Cows turn grass into a nutritious product rich in protein, fats, carbohydrates, vitamins and minerals.

8 In addition to grass and silage, cows eat corn and concentrates. The manufacture and transport of concentrates to the dairy farm takes place under GMP+ supervision and is closely monitored by both the government and industry. Dairy farmers only buy concentrates from companies associated
- with SecureFeed.

9 In order to guarantee optimum feed rations and to prevent contaminants from getting into the milk, silage is thoroughly evaluated and monitored for its quality and composition.

The next link in the dairy chain is milk production at the farm. Important areas of attention here include occupational hygiene, animal health, milk production and milk storage. Dutch dairy farmers follow European regulations and meet several additional requirements set but the Dutch dairy sector.

Occupational hygiene

Proper hygiene at the farm is essential for safe and clean milk as the raw material of dairy products. Hygiene standards cover the maintenance and sanitization of buildings and machines, pest control, the use of pesticides, as well as procedures for the disposal of manure, trash and dangerous substances. Standards also specify conditions for stalls and barns. To support their natural behavior when inside, cows must have access to open, bright, spacious and dry stalls.

Animal health

Dutch milk comes from healthy cows. Animal health is

therefore a top priority in the Dutch dairy chain. Because prevention is better than recovery, the approach to animal health is currently shifting from curative to preventive. Preventive care improves the health and welfare of animals and reduces the use of medicines.

European regulatory standards address how animal illness and drug use on the farm should be documented, housing for the herd, and veterinary checkups. The Dutch dairy chain has established additional standards to further promote animal health. The independent organization GD Animal Health continuously monitors health levels. The dairy sector also takes its own approach to controlling salmonella and paratuberculosis in dairy cows.

In addition, dairy companies require that dairy farmers work with a permanent veterinarian specialized in beef cattle, who meets specific quality standards. Every dairy farmer, together with their veterinarian, sets up a farm

health plan and treatment plan. This contributes to a healthy dairy herd. It also helps the dairy farmer know when and how to treat the cows.

Milk production

Standards for the milking of cows address hygiene and refrigeration. Good hygienic conditions of the cow (a clean udder), the milking machine, the milking parlor and the milking robot make sure that the milk cannot be contaminated with dirt or bacteria. Immediate refrigeration and proper cooling make sure that milk retains optimal quality. Regulations around milk production are incorporated into the quality systems on dairy farms. While these are based on European regulation, Dutch quality systems are more specific and extensive.

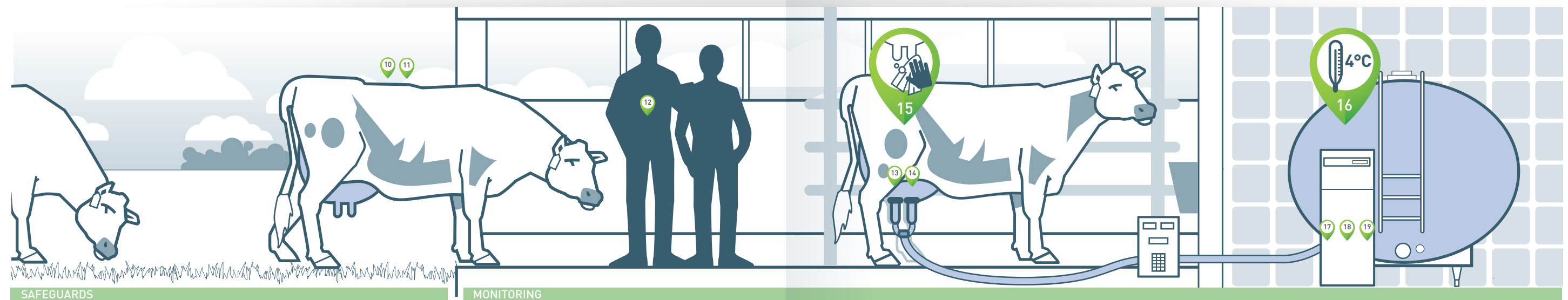
Monitoring

Monitoring on dairy farms takes place in three ways. First, all milk deliveries from a dairy farm are checked for quality. Samples are taken from every delivery and

are tested by independent and specialized laboratories. Specially trained milk tanker drivers also check the milk's smell, color and temperature.

Furthermore, all dairy farms are regularly inspected for compliance with the quality system. These visits can be announced ahead of time, but even with unannounced visits the dairy farm must be in compliance. Discrepancies must be fixed within a set period of time, or the dairy farm risks their milk being refused for delivery to the dairy company. Unacceptable discrepancies can lead to immediate refusal.

Also, to guarantee milk quality, every dairy farm keeps records of a range of data. This data helps identify potential problems and the need for additional inspections.



QUALITY MANAGEMENT ON THE FARM

10 In inclement weather when cows are in the barns, they can walk freely in open, bright, spacious and dry stalls. This fits their natural patterns for eating, sleeping and activity.

11 Every year, the dairy farmer and veterinarian make a farm health plan and a treatment plan. A national monitoring program keeps tabs on the health of the Dutch dairy herd.

12 Dairy farms are usually family companies passed down from parents to children. Dairy farmers are well educated and work closely together to set up a sustainable dairy chain. The average dairy farm in the Netherlands has 89 cows, delivers around 760,000 kilograms of milk each year, and is modernized and well-equipped.

13 Occupational hygiene, cleaning and sterilization are essential for good, clean and safe milk production.

14 Milking machines and milking robots are cleaned, sterilized and checked after every milking. All dairy farmers have a maintenance contract with requirements for the maintenance and replacement of parts. This promotes good udder health and milk quality.

15 Before the milking begins, the udders and teats are cleaned and rubbed dry with a sterilized towel. This improves milk production and contributes to clean milk.

16 Milk is stored for 2-3 days in a hygienic, refrigerated milk tank kept at four degrees Celsius.

17 The milk tank includes a control system that registers data such as temperature, volume and cleaning protocols. After every milk delivery, the tank is cleaned and disinfected.

18 On behalf of the dairy companies, an independent inspection agency monitors milk quality, hygiene, and animal health at all dairy farms.

19 The government (the COKZ and the NVWA), which is responsible for managing farm quality, oversees the monitoring of dairy companies.



The next link in the dairy chain is the transport of milk from the farm to the dairy factory. Milk is picked up and transported by trained drivers in specially-designed tankers; at pickup, the drivers also conduct the first quality check on the milk. The government oversees driver education and expertise, and together with the Dutch dairy chain strictly organizes and regulates milk transport.

The numbers

The Netherlands is home to around 17,500 dairy farms and 1.63 million dairy cows which produce 13.3 billion kilograms of milk each year. Transporting milk to the factory is a sizeable and important activity in the dairy chain. Every hour, 1.5 million kilograms of milk is delivered to factories. About 175 milk tankers and 720 drivers make 850 deliveries a day.

Standards

The legal standards for milk transport begin with EU regulations.

- These requirements include:
- Retention periods for documents;
 - HACCP;
 - Hygiene and procedures for milk transport, pickup and delivery;
 - Design, construction, installation and maintenance of milk tankers;
 - Cleaning and disinfection;
 - Calibration of measuring and registration instruments.

In addition, the dairy sector has set requirements for taking samples, the materials used, and storage, as well as for antibiotics checks by the driver.

Dairy companies have translated these requirements into a quality system for milk transport. Taking samples at the dairy farm is very important. The samples are used later to determine the many characteristics of milk quality and are also important for paying the dairy far-

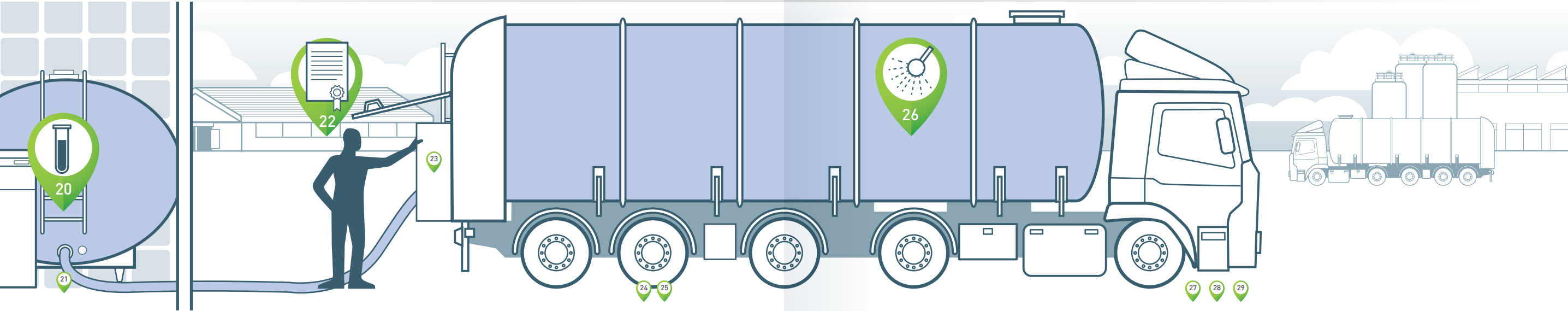
mer. Before milk is delivered to the factory, every milk tanker is checked for antibiotic residues. If levels exceed the legal restrictions, the milk from that delivery will not be processed.

For the legal restrictions and additional requirements, dairy companies have developed a certification process which conforms to the international ISO 22000 standard.

Independent monitoring

Monitoring the milk transport is handled by the governmental organization Netherlands Controlling Authority for Milk and Milk Products, or the COKZ. This organization makes sure that the correct samples are taken by the milk tanker drivers, and is responsible for upholding the payment system for raw milk and for implementing EU and Dutch regulations for driver equipment and procedures.

Twice a year, the COKZ accompanies the driver on milk runs, and ten times a year checks delivery at the factories. The COKZ also oversees driver exams. Transport from farm to factory is thus safeguarded by a certified quality system tailored to the dairy industry.



MILK TANKER CERTIFICATION + INTRATRANSPORT

- 20 At every milk pickup, the driver takes a sample from the milk tank. A sample of milk from the milk tanker (which contains milk from several farms) is also taken just before delivery to the factory. This sample is immediately checked for antibiotics. The taking, transport and storage of samples is strictly regulated and overseen by the government.

21 Milk is transferred from the farm to the tanker through a closed system which directly connects the farm's milk tank to the milk tanker. Loading and unloading the milk tanker takes place under extremely hygienic and methodical conditions so as to maintain the quality of the milk.

22 Milk tanker drivers are well-trained and are certified by the government.
- 23 Strict rules apply to milk transport. These entail hygiene and procedures, HACCP, the health of the driver and his/her personal hygiene, the design and maintenance of the milk tanker, cleaning and disinfecting the milk tanker, loading and unloading, and calibrating measuring instruments.

24 Every year, 13.3 billion kilograms of milk is transported in the Netherlands from farm
- to factory. This is handled by approximately 720 drivers who make 850 runs a day in 175 milk tankers.

25 When an infectious animal disease arises, such as bird flu, additional requirements are set for milk tankers regarding the route driven and tanker use, cleaning and disinfection.
- 26 All milk tankers are cleaned once a day according to a certified procedure.

27 Every milk tanker has an onboard computer with information about route planning, cleaning, calibration, and current milk volumes. The GPS system tracks where the milk tanker is at all times.
- 28 The COKZ accompanies the milk tanker driver on a milk run twice a year. This inspection follows guidelines set by a handbook.

29 A total of 2.3 million analyses are conducted every year in milk transport.



Raw milk forms the basis for many dairy products. Its quality, safety and composition are therefore very important.

The Dutch dairy chain sets very high standards for milk. These are based on both European regulation (the General Food Law, the hygiene package, and regulations regarding animal by-products, animal feed regulation, and veterinary medicines) and Dutch regulation (especially the Dairy Commodities Act and the Animal Act, with its Raw Milk Regulation). On top of this, the dairy sector establishes restrictions for aflatoxins, chloroform and butyric acid bacteria in milk.

Guaranteeing the quality, safety and composition of raw milk rests on two pillars:

- payment for raw milk based on quality parameters set for the dairy farmer;
- a joint monitoring program for contaminants and residues in raw milk, administered on behalf of the Dutch Dairy Association.

Milk quality

Dairy companies determine the quality of milk using samples taken from the milk tanks at every dairy farm. The frequency of these checks varies from once every three days to once a month. Milk tanker drivers take the samples, which are then tested by the independent laboratory Qlip, an ISO 17025 accredited laboratory specialized in dairy. Milk must meet several conditions regarding fat percentage, lactose content, protein content, cell count, bacterial count, contamination levels, freezing point, butyric acid bacteria traces, fat acidity, antibiotics and chloroform content. Test results also help determine payment to the dairy farmer.

Monitoring program for contaminants and residues

The second pillar involves a monitoring program of all raw milk to check for contaminants and residues. The NZO coordinates this program, which sets restrictions for radioactive materials, pesticides, dioxins and PCBs, PAHs, melamine, anthelmintics and several contaminants.

nants. Risk analyses may lead to additional inspections. Qlip handles the testing.

National Plan

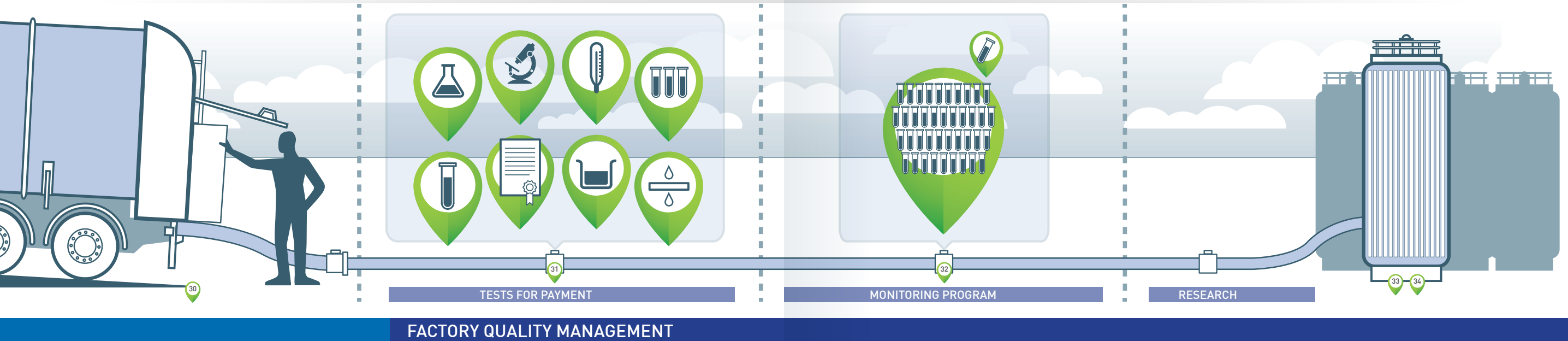
The National Plan is a government program to monitor unwanted substances in food. It is based on the so-called hygiene package from the European Commission, which sets legal standards for unwanted substances in raw milk. The national reference laboratory, RIKILT, tests raw milk for the presence of these substances. Every EU member state has a national plan which is audited regularly to determine the quality of milk across the whole of Europe.

Research

In addition, the Dutch dairy industry has a program, the Joint Research Program in Dairy, that conducts scientific research into the improvement of raw milk safety and quality and thus the quality of dairy products. The program evaluates risks to dairy product safety and quality,

and develops plans to anticipate potential risks. The goal of this proactive approach is continual improvement of the quality of dairy products.

Research findings can lead to updated and more rigorous quality systems. This way, the Dutch dairy sector ensures that its quality programs are always up to date.



30 Safe, nutritious and delicious dairy products require high quality raw milk. For this, the Dutch dairy chain sets the highest standards and never makes compromises.

31 For quality and payment, raw milk is analyzed for fat percentage, lactose content, protein content, cell count, bacterial count, contamination levels, freezing point, butyric acid bacteria traces, fat acidity, antibiotic residues and chloroform content.

32 A rigorous monitoring program makes sure that milk with unwanted substances is not processed. Substances may include radioactive materials, pesticides, dioxins, melamine, aflatoxin and several other contaminants.

33 The Dutch dairy chain's major strength is its proactive and preventive approach. Research is constantly being conducted to improve quality.

34 The outcome of these efforts is the guarantee that the milk processed by dairy companies is not only safe, but also meets the highest quality standards.



The last step in the dairy chain is the processing of raw milk into a range of delicious, healthy and sustainable dairy products. After the quality checks at the farm and during transport, extensive and regular quality controls also take place at the factories. Even at this stage of the dairy chain, both industry and the government oversee and safeguard quality levels.

Milk produced in the Netherlands is processed into consumer products and ingredients that are used by food, pharmaceutical and other companies. This includes cheese (55% of production), milk powder (14%), milk and other products for consumption (8%), condensed milk (7%), butter (2%) and other products (14%). Every day, samples of intermediate and final products are taken at each processing step. Equipment and packaging materials are also inspected. Three to five million tests are administered annually. Factory quality systems are supervised by the government and are audited by independent and certified inspection bodies.

Standards

Raw milk processing falls under EU regulations such as the General Food Law, the hygiene package, and regulations regarding animal by-products, microbiological criteria and contamination of food, pesticides and veterinary medicines. Dutch regulations, set by the Commodities Act and the Animal Act, also apply.

Dairy companies must also meet additional criteria set by food authorities in other countries. Their customers also often place extra requirements, such as those established by food safety certificates recognized by the Global Food Safety Initiative, a cooperation of large producers and retailers which develops requirements for quality programs for food safety.

Monitoring

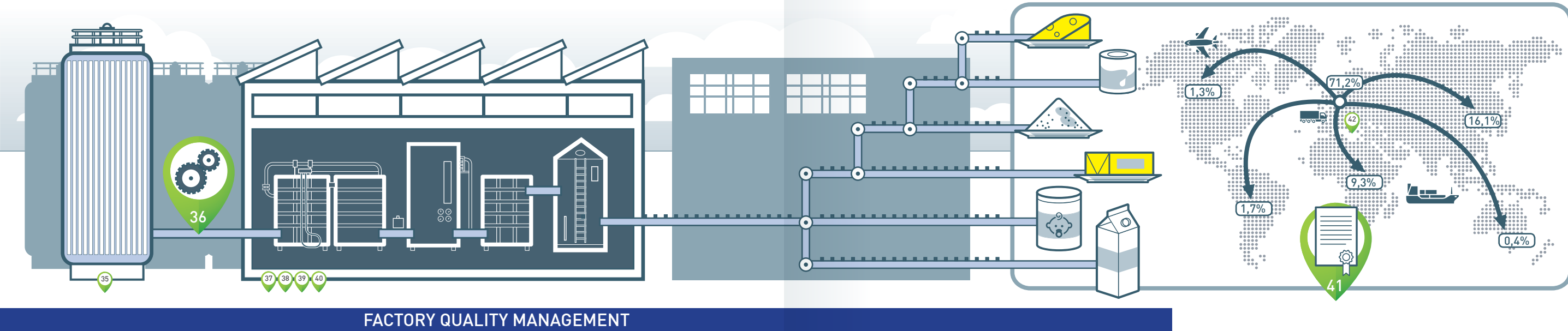
Dairy companies in the Netherlands can be officially certified by the COKZ. Each factory receives its own approval. An oval can be found on the packaging of most dairy products. If a factory is approved by the COKZ, a number is included in this oval.

The COKZ monitors factories for the government. It assesses processes, analyzes dairy products, and evaluates animal byproduct streams. When a factory meets the necessary criteria, the processing company is officially approved, or its approval is extended. If desired, export certificates can also be provided.

Process certification

The quality systems mentioned above apply to all dairy products made in factories, including milk and products for consumption, milk powder, cheese, condensed milk, butter, and a number of other products.

An additional process certification system has been developed for cheese. This is a private and voluntary quality program used by many companies which want to export cheese. This certification system evaluates the storage of raw milk, thermization, lactic acid preparation, curd preparation, whey preparation, cheese ripening and processing (slicing, packaging, transport, etc.), and checks for thermoresistant streptococci, anaerobic spores, acidity, and salt-tolerant lactobacilli. The air quality and conditions of the packaging are also checked. The system conforms to the ISO 22000 and FSSC 22000 standards.



- 35 Raw milk is made suitable for processing into a particular dairy product.
- 36 Dairy companies process milk into cheese, milk powder, milk and products for consumption, condensed milk, butter, and a range of other products.
- 37 3-5 million tests are conducted annually to ensure product quality and safety.
- 38 Quality systems at the factories of Dutch dairy companies are based on international standards: ISO 9001, FSSC/ISO 22000, HACCP, BRC and IFS.
- 39 A supplementary, national and private system for process certification has been developed for cheese. This system was developed in 1994 and is an important management tool in the cheese chain. An audit is very intensive and takes 4-6 days.

- 40 Quality systems at factories conform to EU and Dutch regulations, additional requirements from the dairy sector, customer requirements, and specific requirements from export countries.
- 41 Every year the COKZ issues 70,000 export certificates, including 30,000 veterinary certificates.
- 42 The Netherlands exports 7 billion euros in dairy products every year. Of these exports, about two-thirds go to other EU member states, and one-third to Asia, Africa, Latin America and North America.

ENJOY THE QUALITY GUARANTEE

For many years, the Dutch dairy chain has consistently delivered safe and high quality dairy products. This effort requires indisputable and top-notch safety and quality assurance systems for both raw milk and its processing in factories.

The Dutch dairy chain's approach rests on five pillars:

- Extensive knowledge, professionalism and experience in all links in the chain, and a beneficial climate and soil for milk production;
- Good cooperation and alignment of processes between the various links in the chain;
- Independent oversight of legal compliance and compliance with additional requirements from the sector;
- Proactive and preventive approach supported by an extensive monitoring program for contaminants and residues, and a research program for raw milk safety and quality;
- Good cooperation between industry and research institutes.

A strong approach translated into quality products. Every drop of milk, produced and processed, is safe and clean.



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