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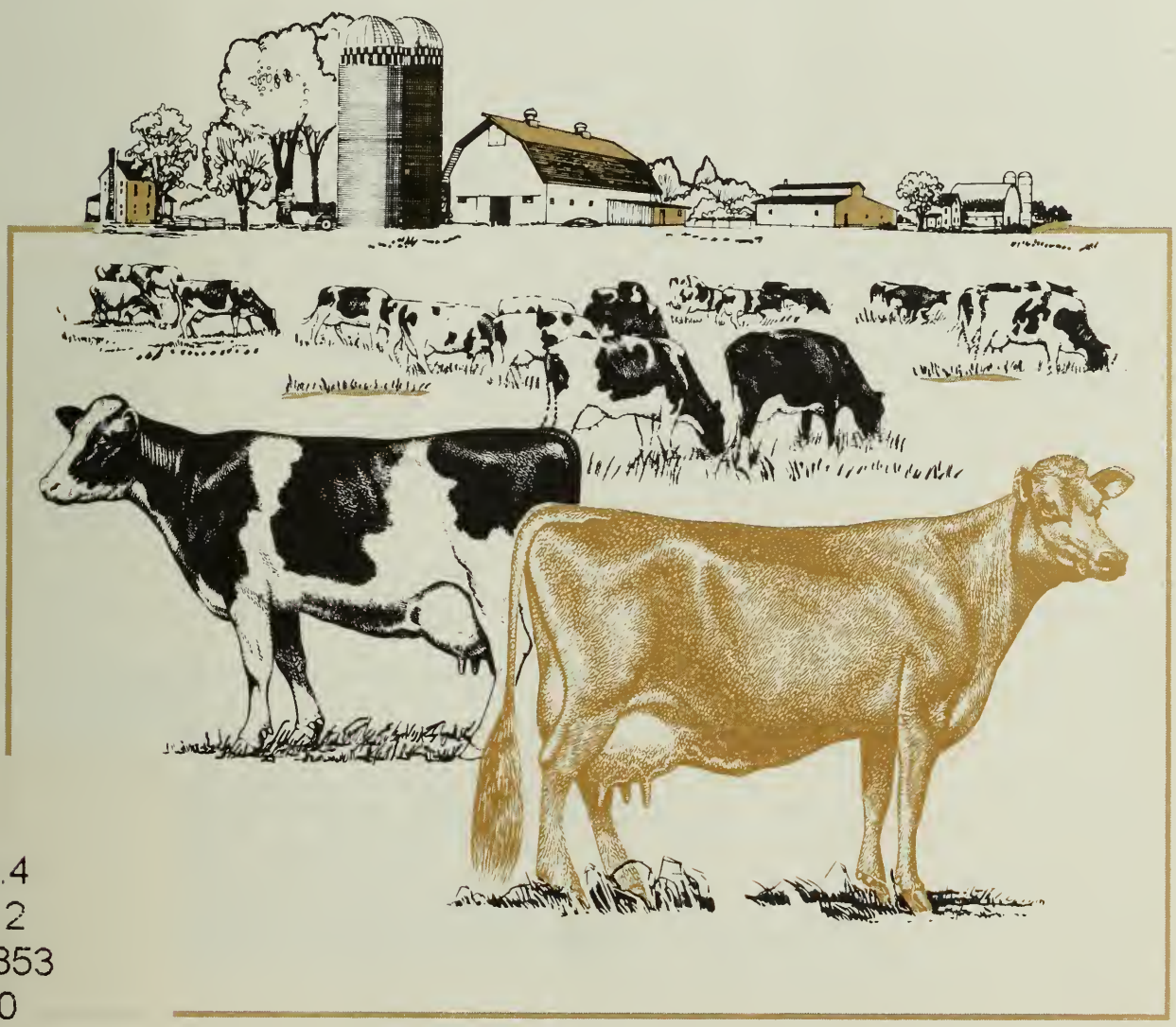
Recommended code of practice for the care and handling of dairy cattle



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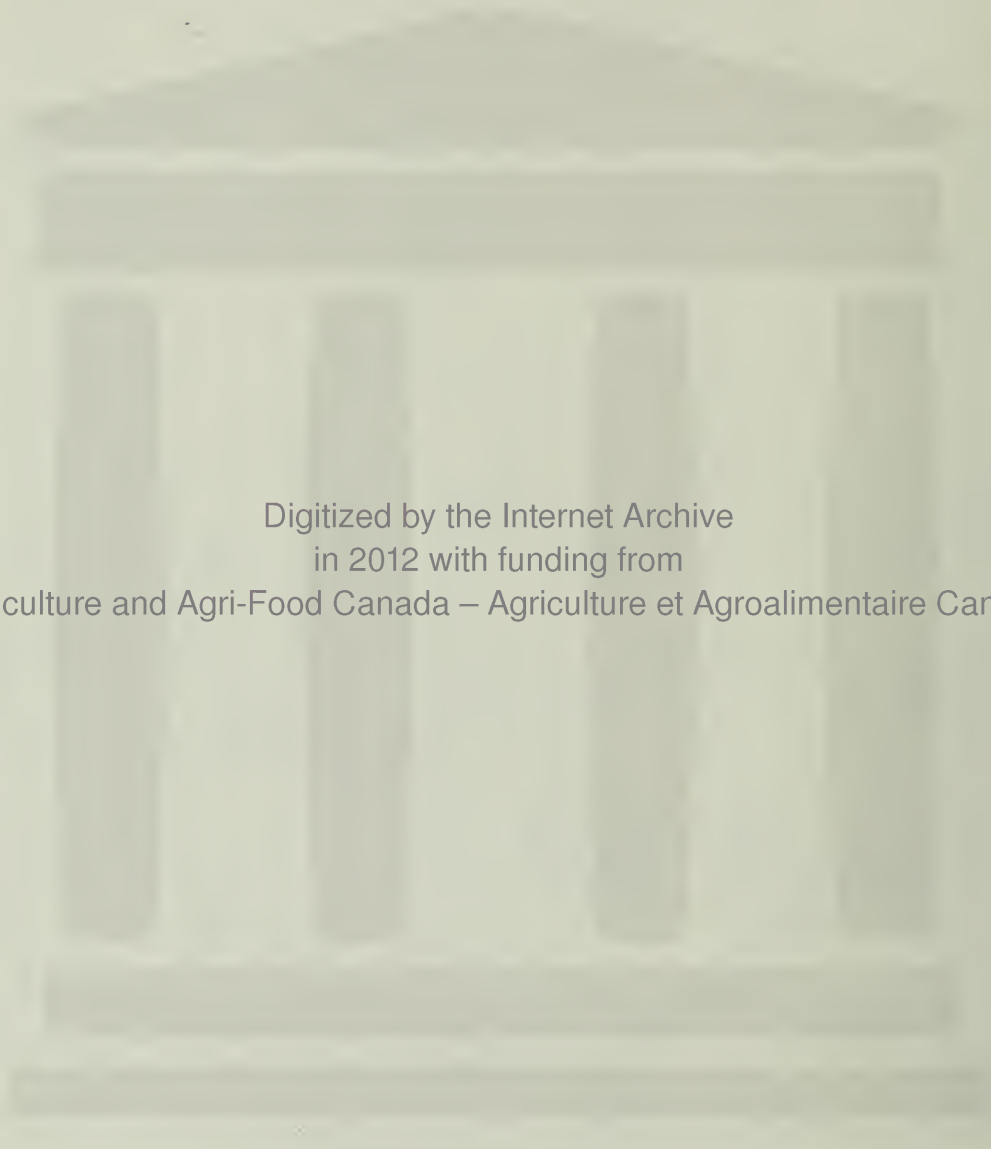

Recommended code of practice for the care and handling of dairy cattle

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Contents

Preface

Welfare codes are intended to encourage livestock producers, stock-keepers, handlers, transporters, and processors to adopt the highest standards of animal husbandry and handling.

In 1980 the Canadian Federation of Humane Societies (CFHS) began coordinating the process of drafting codes of practice for handling all livestock species with the drafting of a code of practice for handling chickens and the agreement of the federal Minister of Agriculture to support the undertaking financially. Subsequently, the Canadian Society of Animal Science (CSAS), at the request of the Agricultural Institute of Canada (AIC) and the Canadian Veterinary Medical Association (CVMA), undertook to prepare draft codes of practice for handling other livestock species. CSAS and AIC agreed that the successful CFHS coordination of the drafting process should continue, and the draft codes were turned over to CFHS. The process has involved representatives of agricultural industries and their organizations, federal and provincial government departments, associations of animal science, representatives of the animal welfare movement, and interested individuals. As a result of this work, the following codes of practice have been published: *Recommended Code of Practice for the Care and Handling of Chickens from Hatchery to Slaughterhouse* (1983); *Recommended Code of Practice for the Care and Handling of Pigs* (1984); *Recommended Code of Practice for the Care and Handling of Special Fed Veal Calves* (1988); *Recommended Code of Practice for the Care and Handling of Mink* (1988); *Recommended Code of Practice for the Care and Handling of Ranched Fox* (1989); and *Recommended Code of Practice for the Care and Handling of Poultry from Hatchery to Processing Plant* (1989), which replaced the *Recommended Code of Practice for Handling Chickens from Hatchery to Slaughterhouse* (1983).

Introduction

The basic requirements for safeguarding the welfare of livestock are an appropriate husbandry system that meets all essential needs of the animals and high standards of stock handling by producers, keepers, transporters, and processors.

Stock handling is a key factor, because no matter how acceptable a system may otherwise be in principle, without competent stock handling, the welfare of the animals cannot be adequately provided for.

Nearly all livestock husbandry systems impose restrictions on the stock, some of which can cause an unacceptable degree of discomfort or distress by preventing the animals from fulfilling their basic needs. Meeting these needs, and others that must be considered, includes providing the following:

- comfort and shelter;
- readily accessible fresh water and a diet for maintaining the animals in full health and vigor;
- freedom of movement;
- the company of other animals, particularly of like kind;
- the opportunity to exercise most normal patterns of behavior;
- light during the hours of daylight and lighting readily available to enable the animals to be inspected at any time;
- flooring that neither harms the animals nor causes undue strain;
- the prevention of abnormal behavior, injury, parasitic infestation, and disease, and rapid diagnosis and treatment when indicated;
- the avoidance of unnecessary surgical alteration; and
- emergency arrangements to cover outbreaks of fire, the breakdown of essential mechanical services, and the disruption of feed supplies.

The welfare of dairy cattle can be safeguarded and their needs met under a variety of management systems. The system, and the number and stocking rate of dairy cattle kept at any one time, should depend on the suitability of the conditions and the skills of the stock handler.

Consideration should be given to animal welfare whenever the use of technology increases on the farm. Complex systems may control a variety of factors, such as temperature, air flow, and feed and water supply, but a system might still fail as a result of mechanical or electrical breakdown. It is essential to provide alarms and backup systems to prevent the animals from suffering in the event of a technical breakdown.

Regardless of the size of the herd, adequate human resources have to be provided to ensure a high level of attention and care, and to safeguard the welfare of individual animals. Particularly in large herds, enough time and effort must be invested in the observation of individual animals.

Everyone involved in handling dairy cattle should be familiar with their normal behavior. Badly managed and unhealthy cattle do not do well. It is important that ample time be devoted to the inspection of stock and the checking of equipment.

Adequate facilities and resources must be available to supply proper housing; a consistent, appropriate, and reliable source of feed and water; treatment for injured or sick animals; and anything else necessary to ensure the well-being of the cattle. An animal that is obviously in distress should receive prompt and appropriate medical treatment or other care when necessary. Neither financial cost nor any other circumstance should result in a delay in treatment or in the neglect of the animals.

This code has been prepared on the basis of the soundest current practices. It identifies the areas where the cattle's welfare could be at risk unless precautions are taken. The code sets out what these precautions should be, bearing in mind the importance to the cattle of their total environment and the fact that there is often more than one way in which their welfare can be safeguarded.

In this code the word cattle refers to dairy cattle of all ages. Where special provisions for animals under 6 months apply, the word calf has been used. The term competent person refers to an individual who has acquired and demonstrated suitable skills, experience, and proficiency to perform, or assist in performing, specifically identified activities or procedures.

Although the word must is used occasionally to emphasize the importance of a specific practice, the code is voluntary. It is intended to be used by members of industry, scientists, and animal welfare groups as an educational tool in the promotion of sound husbandry and welfare practices. It should also be recognized that new scientific discoveries and changing economic conditions will necessitate updating the code as required.

Section 1. Housing

At all stages of life, cattle should be housed under conditions conducive to health, growth, and good performance. Advice on aspects of welfare should be sought when new buildings are to be constructed or existing ones modified.

1.1 General

1.1.1 Buildings that permanently house cattle should be designed and equipped to maintain an adequate internal environment under normal weather fluctuations in a given locality.

1.1.2 Passages, pens, and stalls should be constructed so that animals can enter them and can move about freely without physical obstruction.

1.1.3 Preservatives or paints that come into direct contact with feedstuffs should not contain chemical compounds that are harmful to the animals or that could contaminate the marketed product. Pressure-treated lumber should not be used in contact with feedstuffs; in particular, it should not be used in feed bunks or mangers.

1.1.4 Housing facilities and materials used for barn interiors should be easy to clean and sanitize.

1.1.5 Fittings and internal surfaces of buildings, pens, milking parlors, stalls, and passages accessible to cattle should not have sharp edges or projections; fittings should be arranged so as to avoid injury or pain to cattle.

1.1.6 Stalls, tethers, and pens must be in good repair, must allow for sufficient freedom of movement, must prevent injury, and must allow the animals to be kept reasonably clean.

1.1.7 All floors, particularly those that are slotted, should be designed, constructed, and maintained to provide good traction and comfort and to prevent distress or injury to the animals. Remedial action should be taken promptly when required.

1.1.8 A dry lying area should be available to all housed cattle.

1.1.9 Milking or dry cows should not be kept on a totally slotted floor. A solid floor area, incorporating soft, dry bedding such as straw, shavings, or other suitable bedding material, should be provided to ensure comfort and reduce the risk of injury to the udder. Rubber mats, covered by other bedding material, can serve as a comfortable base.

1.1.10 Where slotted floors are used, the recommended spacing between slats is as follows:

- For an animal that weighs up to 200 kg (440 lb) liveweight, a space of 20–30 mm (3/4–1 1/4 in) is recommended; for over 200 kg (440 lb) liveweight, 25–40 mm (1–1 5/8 in).
- The recommended minimum slat width is 80–130 mm (3 1/4–5 1/8 in), depending on the size and weight of the animal.
- Slat width must be consistent, and the slats must be mounted so that they stay firmly in place. The slats should not have sharp and abrasive edges and must be in good repair.

1.1.11 At calving time, cows should be provided with separate pens that have solid, nonslip floors and contain appropriate bedding.

1.1.12 Open and unroofed housing facilities should be designed so that the floor is high enough, is sloped to prevent flooding, and allows the pens to be kept clean and dry.

1.1.13 Illumination of barn interiors should permit easy visual inspection of all animals at any time. All sections of walking passages for cattle should be illuminated as uniformly as possible.

1.1.14 Provision should be made for the segregation and comfort of sick or injured animals.

1.1.15 All equipment and services, including feed hoppers, waterers, milking machines, ventilating fans, heating and lighting units, fire extinguishers, and alarm systems, should be cleaned and inspected regularly and kept in good working order.

1.1.16 When the cattle's welfare is dependent on an automated system, the alarm system should be incorporated, whenever possible, to warn of failure. All systems should be tested regularly.

1.1.17 In case the automated system breaks down or a power failure occurs, alternative ways of feeding, supplying water, operating machinery used for milking, and maintaining a satisfactory environment should be available. In large, mechanically ventilated barns, additional doors or openings in the sidewalls can be an alternative method of emergency ventilation.

1.2 Space allowances

1.2.1 The space allowance for cattle housed in groups should be calculated in relation to the whole environment, to the size of the group, and to the age, sex, weight, and behavioral needs of the stock.

Extra space allowance is recommended when housing cattle with horns.

1.2.2 All cattle, whether tethered or in pens, should have enough freedom of movement to enable them to groom themselves, to lie on their sternum, and to get up and lie down normally. When ties are used, they should not cause injury or discomfort to the cattle.

In renovated or new tie-barn facilities, cattle should be provided with enough freedom to lie on their sternum with the head turned back.

1.2.3 In a free-stall barn, one stall for each cow is recommended. However, the number of cattle housed should not exceed the number of stalls by more than 10%.

1.2.4 All cows that are tied in stalls at any time during the year should be released routinely for exercise when weather conditions permit.

1.2.5 Individual housing units must be constructed to allow the calves freedom to stand up and lie down at any time, and to rest comfortably; the units must also provide an opportunity for the necessary exercise of limbs. The interior of the unit must be free of protrusions, sharp edges, and openings that can cause injury or discomfort. All calves housed in individual pens should be able to see their peers but should not be able to suckle them.

1.2.6 Stall dimensions should be not less than recommendations in Tables 1 and 2.

Table 1 Dimensions for tie stalls*

Animal size		Stall width		Stall platform (length with trainer*)	
kg	(lb)	mm	(in)	mm	(in)
400	(880)	1000	(40)	1450	(58)
500	(1100)	1100	(44)	1500	(60)
600	(1320)	1200	(48)	1600	(64)
700	(1540)	1300	(52)	1700	(68)
800	(1760)	1400	(56)	1800	(72)

* Stalls should be 100 mm (4 in) shorter if used without trainers. For new or renovated facilities, stalls of varying width are recommended. When planning the length of tie stalls, keep in mind that they will be affected by the design of the tie system chosen.

Table 2 Dimensions for free stalls*

Animal size		Stall width		Stall length (including curb)	
kg	(lb)	mm	(in)	mm	(in)
100	(220)	700	(28)	1200	(48)
200	(440)	800	(32)	1400	(56)
300	(660)	900	(36)	1650	(66)
400	(880)	1000	(40)	2100	(84)
500	(1100)	1100	(44)	2250	(90)
600	(1320)	1200	(48)	2250	(90)
700 and over	(1540)	1200	(48)	2250	(90)

* Reprinted from Canada Plan Service, Dairy Cattle Housing and Equipment, Plan M-2000.

Note: In a free-stall system all stalls must accommodate the largest animal in the group.

1.2.7 One maternity pen with a minimum size of 10 m^2 (100 ft^2) and a minimum width of 2.5 m (8 ft) should be provided for each group of 20–25 cows. In newly constructed or renovated facilities the maternity pens should have a minimum size of 11 m^2 (120 ft^2). Whenever possible, movable partitions between maternity pens are recommended to give greater flexibility to the size of pen available.

1.2.8 In free-stall or loose-housing systems, one sick pen with a minimum size of 10 m^2 (100 ft^2), equipped with a stanchion or tie for restraint, should also be provided for each group of 40 cows. Sick pens should be designed to allow the temperature to be regulated and drafts to be reduced.

1.3 Ventilation, temperature, and humidity

1.3.1 Ventilation systems should be capable of maintaining an adequate microclimate under normal local weather conditions, keeping the barn dry, removing stale air and strong odors, bringing in fresh air without drafts, and removing excess heat and moisture.

1.3.2 In conventional year-round housing, or in barns without windows or with windows that do not open, a system of fans, properly installed and located, should be able to deliver, for summer ventilation, of at least 190 L/s (400 cfm) for every cow that weighs 450 kg (1000 lb).

1.3.3 Although healthy young calves can easily tolerate low air temperatures, air movement should not cause discomfort to calves in pens. Calves of all ages should be protected from dampness and drafts. This is particularly important for calves of up to 4 weeks of age and for sick calves.

1.3.4 Dust and noxious gases such as ammonia, carbon dioxide, hydrogen sulfide, and methane may develop in various housing systems. In totally enclosed housing systems the ventilation system must be designed to allow the prompt removal of such gases. Regular inspection and maintenance of component parts are necessary to ensure proper operation. Manufacturers' design specifications should be followed to ensure proper operation.

1.3.5 Air inlets should be properly positioned and hooded to avoid drafts. Fan capacity should be matched to move the required volume of air. Thermostats should be used for automatic control of fans.

1.3.6 Under normal winter conditions, the relative humidity inside a housing facility should not exceed 75%.

1.4 Emergencies and safety

1.4.1 All staff should be familiar with all appropriate emergency procedures.

1.4.2 Newly designed or renovated cattle-housing facilities should be constructed to facilitate emergency evacuation.

1.4.3 A plan to evacuate cattle in an emergency (for example in the event of fire, flood, or chemical spill) should be developed and reviewed regularly. The plan should include consideration of emergency housing, transportation, and personnel.

1.4.4 The installation of an effective alarm system for fire and power failure is recommended. Fire extinguishers should be available in all buildings.

1.4.5 Some mechanized dairy farms occasionally experience problems of stray voltage. Corrective measures to control stray voltage should be discussed with dairy extension personnel or other specialists, and steps should be taken to solve the problem.

1.4.6 Electrical panels should be inaccessible to cattle.

1.5 Manure handling

1.5.1 Unless a deep-litter system is used, lying areas should be cleaned frequently and thoroughly enough to avoid heavy soiling of the animals, particularly the udders of dairy cows.

1.5.2 Where a deep-litter system is used, the manure pack should be well drained and enough bedding should be added regularly to ensure a dry lying area, thereby preventing heavy soiling of the animals.

1.5.3 When a solid-manure system other than a deep-litter system is used, the manure should be removed from the barn daily.

1.5.4 In a free-stall system, the manure should be removed from the alleyways frequently.

In a liquid-manure system, care must be taken to avoid gas buildup in the barn when the holding tank is emptied.

When new facilities are constructed, it is recommended that holding tanks be constructed outside the barn.

1.5.5 Since contact between animals and manure cannot be prevented completely, appropriate care should be provided, particularly when animals are tethered, to keep the animals clean.

1.5.6 If cow trainers are used to improve the cleanliness of tie stalls, they should be individually adjusted. They should be positioned far enough from the curb that cows have enough space to assume a normal stance for urination or defecation, while standing at the rear of the stalls. Cow trainers should be mounted so that they remain horizontal and in the proper position.

1.5.7 If an alternating electric current is used as a power source for cow trainers, a shock reducer should be installed to reduce the voltage going to the trainers.

Section 2. Feed and water

All cattle should receive feed and water on a daily basis.

Producers should be familiar with the basic nutritional requirements of their livestock, outlined in the U.S. National Research Council standard, *Nutrient Requirements of Dairy Cattle*, published by the National Academy Press, Washington, D.C. Information is available through provincial agricultural ministries and feed manufacturers.

All commercial feeds must comply with feed regulations as provided by the Feeds Act of Canada.

2.1 Feed

2.1.1 All cattle should receive a daily diet that is adequate for maintaining full health and vigor. The composition of diets should reflect production level, reproduction stage, body size, housing, and weather conditions.

2.1.2 All feed components used in the ration must be of good quality and free of spoilage. Manufactured components used in a ration or in the storage of feed, e.g., silage preservatives, must be of approved quality and must be used according to manufacturers' recommendations and regulations, where applicable.

2.1.3 Except when required for medical purposes, feed interruptions for longer than 24 h should be avoided.

2.1.4 When cattle are fed in groups, enough manger or trough space, or feeding points, should be available to avoid undue competition for feed, particularly if feed is not available ad libitum.

2.1.5 Feed troughs must be cleaned regularly, and feed that has not been consumed must be removed. This requirement is of particular importance when using high-moisture feeds, which have a high probability of spoilage.

2.1.6 To prevent nutrition-related health problems, caution is advised when feeding highly concentrated rations. Most digestive problems can be prevented by using a mixed ration that contains enough fiber and that has a particle size that is large enough to promote normal rumination.

2.2 Feeding of calves

2.2.1 Depending on the size of the animal, it is vital that every calf receive at least 1.5–2 L of colostrum as soon as possible after birth, and certainly within the first 4 h of life. Each calf should consume 8–10% of its body weight in colostrum or milk over at least two meals for the first 3 days after birth.

2.2.2 The feeding diet for calves must include all known nutritional components necessary for normal growth and health according to physiological requirement and age. Solid, palatable feed, including roughage, should be a part of the diet by at least 4 weeks of age. Calves must have access to clean water.

2.2.3 All calves should have enough opportunity to become familiar with feeders and waterers. Where necessary, calves should be assisted when introduced to pail feeding.

2.2.4 Utensils for feeding liquids must be thoroughly cleaned and sanitized immediately after each use. Troughs and buckets should be kept clean, and any stale food should be removed. Automatic-feeding equipment should be cleaned at regular and frequent intervals.

2.2.5 A calf should not be removed from the farm of birth for at least 3 days, unless it is to be suckled by another newly calved cow or unless it is being shipped directly to a place of slaughter. A calf should not be sent to a dealer or to market before it is 3 days old, unless it is with its dam. A calf showing any signs of ill health should not be moved except for treatment.

2.3 Water

2.3.1 Cattle should have access to fresh clean water at all times.

2.3.2 Drinking water should come from an uncontaminated source. The temperature of drinking water should not be higher than 24°C.

2.3.3 When an unavoidable interruption in water supply occurs, it should not exceed 12 h, particularly when the temperature exceeds 28°C.

2.3.4 Water troughs, especially those in loose-housing units, should be constructed and located so that they are protected from fouling and so that the risk of the water freezing in cold weather is minimized. Water troughs, bowls, and nipples should be kept thoroughly clean and should be checked at least once daily to ensure that they are dispensing water properly.

2.4 Health care of the herd

2.4.1 The manager of a dairy operation should develop, in consultation with a veterinarian, sound sanitation and immunization programs, appropriate for the type of facilities and management system used. Increased housing density and larger herd size necessitate close attention to prevent disease.

2.4.2 The manager of a dairy facility should maintain a health record, including treatment and medication used for every animal. Medication must be administered by competent personnel.

2.4.3 With the exception of preventive health care programs recommended by a veterinarian, medication should be used only to control clinical disease or to treat injuries. Medication should not be used to replace good husbandry practices.

2.4.4 The dosage, time, and the length of application of prescribed medication must follow the recommendation of a veterinarian or, in case of readily available medication, the recommendation of the manufacturer. Animals must be treated only with approved medication. Requirements for withdrawal of medication before milking or before animals are marketed for human consumption must be strictly adhered to.

2.4.5 When medical treatment is prescribed by a veterinarian, written instructions regarding all aspects of the treatment and medication used should be left with the herdsperson.

2.5 Surgical procedures

2.5.1 Any elective surgery, such as castration, removal of extra teats, cauterization, or dehorning, must be conducted only by competent personnel using proper equipment and veterinary techniques. Such surgery should be performed as early as possible in the development of the animal to ensure a short recovery time. Persons conducting surgery must take all precautions, such as the use of local anesthetics, to avoid causing unnecessary pain during the operation and suffering during the recovery period.

2.5.2 Animals should be dehorned within the first 3 months after birth by a competent person using acceptable techniques. More mature cattle should be dehorned by using only acceptable veterinary surgical techniques.

Section 3. Pastures

3.1 General

3.1.1 Application of fertilizer and chemical control of weeds and parasites in pastures must be timed and applied to prevent any health risk to the grazing animals. Before and during the grazing season, pastures should be checked regularly for poisonous plants.

3.1.2 To prevent digestive problems, cattle, particularly young animals, should become adjusted gradually to pasture feeding. The time needed for appropriate adjustment depends on the difference between the nutritional composition of the diet fed before the animal is placed on pasture and the nutritional composition of the pasture. Some dietary adjustment is also needed at the end of the grazing season.

3.1.3 Cattle permanently on pasture should have access to enough good-quality feed and water to meet recommended nutritional needs. If, for whatever reason, the pasture is inadequate, additional feed supply must be provided on a daily basis.

3.1.4 Pastures where cattle are kept over long periods, or permanently during the season, should have natural or artificial shelters that provide shade and protection against adverse weather conditions. Out-wintered cattle should have access to a well-drained lying area and to adequate supplementary nutrition when necessary. Pastures that are far from the barn should be equipped with simple facilities for the restraint and treatment of animals.

3.1.5 Fences on pastures must be safe and must be maintained properly. Electric fences must be of approved design and must be installed and maintained according to the manufacturer's specifications. The intensity of electric pulses must be effective but must not harm the animals.

3.1.6 Cattle on pasture should be inspected regularly. Fly and insect populations should be monitored regularly, and appropriate control measures should be applied whenever necessary.

Section 4. Delivery of calves; care of calves and young cattle

Research and experience have demonstrated that management and care of pregnant cows have an impact on the future performance of the calves as herd replacement animals and as vealers. The impact on the economy of the operation, and principles of humane treatment, therefore dictate the best care for the cow and calf.

4.1 Calving facilities

4.1.1 Calving pens should be not less than 10 m^2 (100 ft^2), with a minimum width of 2.5 m (8 ft). They should be designed to permit any required assistance during delivery and should provide a comfortable, dry environment for the cow, free of protrusions and sharp edges.

4.1.2 Each calving pen should be equipped with a feeder and a source of water. Before pregnant females are placed in calving pens, the pens should always be clean, dry, and well bedded. They should be constructed so they can be easily disinfected. Bedding material in newly occupied calving pens should always be fresh and clean.

4.1.3 Calving pens should be well lit and properly ventilated but with minimal draft.

4.1.4 Cows should be familiar with the pen before calving. Consequently, they should be placed in the pen 2–3 days before expected calving.

4.1.5 When calving pens have been used for other purposes, they should be thoroughly cleaned and sanitized before they are used for calving.

4.1.6 All possible disturbances, such as unfamiliar noises, visitors, and the presence of dogs, should be minimized during calving.

4.2 Delivery and neonatal care

4.2.1 Although delivery without complication is most common in cattle, cows that have difficulties (dystocia) should be assisted by a competent person maintaining high standards of hygiene and using proper equipment. When delivery is conducted without the presence of a veterinarian, the following basic rules should be observed:

- Do not interfere if the cow is making progress alone.
- Do not apply traction until the birth canal is fully open and proper presentation of the calf has been established.
- Time the application of traction to coincide fully with the cow's rhythmic effort.
- Avoid a long, steady pull but maintain light tension between the cow's rhythmic efforts.
- The direction of the pull normally should be slightly downward.

4.2.2 All newborn calves should be handled gently. After delivery, the initiation of respiration by the newborn calf is of prime concern. Fetal membranes covering the nostrils should be removed immediately after birth. If necessary, fluids from the respiratory tract should be drained by elevating the posterior part of the body and applying artificial respiration. In most cases the umbilical cord is severed naturally during the birth process; otherwise, it should be cut approximately 5–8 cm (2–3 in) from the calf's body. A bleeding umbilical cord should be tied immediately. All newborn calves must be disinfected in the area of the umbilical cord.

4.2.3 Cows show a strong tendency to lick newborn calves. Licking hastens drying of the calf and benefits the calf's respiration. Care should be taken to ensure that licking does not damage the umbilical area and cause bleeding.

4.2.4 Calves should receive colostrum as soon as possible after birth (not later than 4 h) and for 3 days thereafter (see also Section 2.2.1).

4.2.5 Expulsion of the placenta is normally completed within 12 h. If the placenta has not been expelled within 24 h after birth, the cow should be monitored closely to ensure that its health is not at risk.

4.3 Calves

4.3.1 When calves are separated from their dams they should always be moved to clean and sanitized housing.

4.3.2 The separation of calves from cows should be complete to minimize the length of adjustment time.

4.3.3 When calves are housed in individual pens, they should have freedom to stand up or lie down and rest comfortably and should have an opportunity to exercise their limbs. The interior of the pens must be free of protrusions or openings that can cause injury or discomfort. All calves housed in individual pens should be able to see their peers.

4.3.4 When young calves are housed in groups, pens must be large enough to allow all calves to rest comfortably at the same time. Calves housed in the same pen should be of similar size. The interior of pens must be free of protrusions and sharp edges or openings that can cause injury or discomfort.

4.3.5 When outdoor hutches are used they should be made of wood or other materials that are thermally low-conductive. The individual hutches must be large enough to allow calves to rest comfortably on dry bedding material and must offer effective protection of the resting place against rain, snow, groundwater, and draft. Calves must have free access to the resting areas at all time. When temperatures are low, the amount of feed provided must supply the extra energy needed for maintaining normal health in cold weather. When hutches are reused they should be moved to a clean location. Each hutch should be occupied by only one calf.

4.3.6 Calves should be fed at regular intervals but not less than twice a day.

4.3.7 The feeding program for calves should provide all dietary components necessary for normal growth and health according to physiological requirements and age. Some solid feed should be part of the diet by at least 4 weeks.

4.3.8 In totally enclosed barns, light of sufficient intensity for the calves to observe one another is recommended for a minimum of 8 h within a 24-h period.

4.3.9 Hot and humid weather may cause calves discomfort. Attendants should be familiar with changes in calf behavior that indicate stress and should take steps to alleviate discomfort when stress is apparent.

4.3.10 Environmental factors known to contribute to illness and abnormal behavior in calves are fluctuating temperatures in the pen, ineffective ventilation, and nutritionally unbalanced diets. Whenever these factors are observed, steps must be taken immediately to correct them.

4.4 Young cattle

4.4.1 Whenever young cattle are moved to new housing units, the units should be clean and have appropriate bedding.

4.4.2 Each group housed together should consist of animals of similar size, and the composition of the group should be kept as stable as possible.

4.4.3 The pen should be large enough to allow all animals in the group to rest comfortably and feed at the same time.

4.4.4 When young cattle are housed in tie stalls, tethering devices should be adjusted regularly to the size of the growing animals.

4.4.5 Cattle in open lots or on pasture should have access to natural or artificial shelters to protect them from harsh weather conditions.

Section 5. Herd management

5.1 General

5.1.1 To minimize aggression, the composition of a group of cattle should not be changed frequently. New animals should not be introduced into an established group unless necessary.

5.1.2 Animals with horns, especially those that are aggressive, should never be mixed with dehorned cattle.

5.2 Supervision of cattle

5.2.1 All buildings that house cattle should be checked daily. Housing facilities should permit easy visual inspection of all animals. This is especially important on premises where one attendant is responsible for a large number of animals.

5.2.2 Sick or injured animals must be treated immediately or disposed of humanely. Carcasses should be removed immediately and disposed of according to applicable provincial and federal legislation.

5.2.3 It is mandatory for some diseases to be reported under federal and provincial legislation. If an animal is suspected of having such a disease, a veterinarian must be advised immediately. When a reportable disease has been confirmed, the producer must immediately introduce the appropriate measures required under the provisions of the applicable legislation.

5.2.4 An animal that is obviously in distress should receive prompt and appropriate medical treatment or other care. Neither financial cost nor any other circumstance should result in a delay in treatment or in the neglect of such animals.

5.2.5 Attendants should check regularly all cattle for external parasites. If external parasites are detected, the animal should be treated as soon as possible.

5.2.6 The animals' legs should be checked periodically to detect and treat injury or disease. Hoof infection or leg abrasions must be treated without delay. Hoof care of all animals must be conducted as required and at regular intervals by a competent person using proper equipment. When hooves are being cared for, devices used for restraining the animals must be safe for personnel and for animals.

5.2.7 Barns and lots should be cleaned regularly. The frequency of cleaning depends on the housing system used. However, feeding and watering devices should be cleaned daily. Manure should be removed from under the slats with caution. Gases may have accumulated that are dangerous to personnel and to animals (see Section 1.5.4).

5.2.8 A regular program of rodent and pest control should be in place using appropriate, humane methods.

5.3 Identification

5.3.1 The type of animals and the production system used determine whether animals need to be identified and the choice of the marking method. In all circumstances the marking of cattle for identification should be done with care to avoid unnecessary pain or distress and to minimize traumatic experiences of the animals at or after marking. Acceptable methods of permanent marking include tagging, tattooing, implantation of microchips, notching or punching of the ear, or freeze-branding. Caustic paste or hot irons should not be used for branding animals.

5.3.2 If aerosols or paints are used for temporary marking, only nontoxic materials should be used.

5.3.3 Neck bands, chains, tail bands, or leg bands used for identification should be fitted with care and adjusted as required to avoid unnecessary pain or distress to the animals.

5.4 Attendants

5.4.1 All personnel working with cattle should understand and accept their responsibility to prevent avoidable suffering of animals.

5.4.2 Before duties are assigned, producers should be satisfied that attendants responsible for the animals' care have the skills necessary to respond to the needs of all cattle entrusted to them. Attendants should be able to recognize behavioral symptoms that indicate discomfort or disease and should know when to consult a veterinarian.

5.4.3 Working routines of attendants should be consistent and should be performed on a regular schedule. People should move about in a way that minimizes disturbances. Equipment should also be moved with a minimum of disturbance.

5.5 Handling of cattle

5.5.1 Cattle should be handled quietly but firmly at all times and with care to avoid unnecessary injury, pain, and distress. Any enforced action must be consistent with the animals' natural movements and typical physical capabilities.

5.5.2 Before handling animals, attendants should become familiar with the animal and should choose the safest route of approach.

5.5.3 Animals should always be aware of an approaching person. Attendants must avoid activities that cause unnecessary fear in animals. People's actions and movements should be quiet and consistent. Animals properly handled from an early age respect a handler's commands and obey them with ease.

5.5.4 Equipment for handling and restraint should be effective without causing unnecessary stress or pain to the animals and should be designed for maximum safety of the handler.

5.5.5 Punishment of animals should generally be avoided, but if it is necessary it must always be applied with discretion.

5.6 Milking parlor and milking

5.6.1 Access routes to the milking parlor should be safe and properly illuminated. The floor should have good traction and should be kept clean.

5.6.2 The interior of the milking parlor should provide the cows with adequate comfort. Gates and restraining devices of individual holding units must operate safely. The holding unit itself must be free of protrusions that might cause injury or distress.

5.6.3 Cows should not be made to wait for extended periods before entering the milking parlor; as much as possible, the waiting time should be consistently maintained for each milking.

5.6.4 When cleaning and preparing the udder for milking, dairy workers should maintain high standards of hygiene consistent in quality and duration of procedure. It is important that all teats and surrounding parts of the udder be adequately dried before milking.

5.6.5 Only milking equipment with an appropriate vacuum level, pulsation rate, and pulsation ratio should be used. Attention must be given to maintaining such equipment in good working condition.

5.6.6 Overmilking should be avoided. To reduce infection of the mammary gland, the teats of cows should be dipped into a suitable solution as soon as the milking unit is removed.

5.6.7 Painful stimuli or other unpleasant experiences, such as medical examinations, should not be associated with the milking parlor. Negative experiences (including mutual pushing or butting) and other handling difficulties hinder the cows' milk release.

5.6.8 Milking routines should be as consistent as possible.

5.6.9 The milking parlor and milking equipment should be kept clean at all times. The parlor should be cleaned thoroughly immediately after milking, and the equipment should be properly sanitized.

5.7 Breeding and insemination

5.7.1 To prevent health problems in the later stages of an animal's life, the general development of the heifer should be considered in deciding the timing of first insemination, as development may vary with breed, nutrition, and other factors.

5.7.2 To reduce the likelihood of calving difficulties, sires should be carefully selected, taking into account breed, size, age, and previous record. Cows and heifers should be managed so that they are in suitable body condition at the time of calving.

5.7.3 Where natural mating is conducted, proper attention must be given to the health of the male and female to prevent the spread of infection.

5.7.4 Areas where natural breeding is conducted must have secure footing and adequate ceiling height for uninhibited mounting; the areas should be free of protrusions or sharp edges.

5.7.5 The body weight and size of the bulls used in natural breeding must be appropriate to the size and physical development of the cows or heifers in order to prevent injury or undue stress to mounted females.

5.7.6 Because of their size and strength, bulls used in natural mating may be dangerous. All precautions must be taken to ensure the safety of personnel and visitors to the facilities.

5.8 Breeding bulls

5.8.1 Pens for breeding bulls should be clean and dry before the animals are housed. The interior of the pen should be safe for the animals, free of protrusions and sharp edges. Pens should be designed to enable a safe approach to the animal for handling and necessary care. Construction of the pen and quality of the material used should be adequate for the size and power of the bull.

5.8.2 Walking routes to exercise paddocks and semen collection areas should have floors with good traction and should be designed to prevent injury or discomfort to the animal. All routes and areas for the manipulation of breeding bulls should have barriers that are strong enough to protect the handlers.

5.8.3 Bulls housed in close-confinement systems should always be provided with enough freedom to rise, stand, and lie down comfortably. The length of a single stall must permit comfortable rising, standing, and lying; the width should be approximately the wither height of the animal.

5.8.4 The diet for breeding bulls should provide balanced nutrition, adequate to their body size and breeding load.

5.8.5 Attendants handling bulls for semen collection should be familiar with each animal and should be knowledgeable and skilled in collecting semen.

Section 6. Transportation

6.1 Definitions

6.1.1 *Vehicle*: any means of conveyance used for the transportation of all classes of dairy cattle, including trucks, railway cars, ships, and airplanes.

6.1.2 *Container*: a box or crate that is constructed for the shipment of dairy cattle and that can be moved from one means of transportation to another.

6.2 Transportation—General

6.2.1 Transport crews should be properly instructed on and knowledgeable about the basic facts of animal welfare and should be skillful in handling cattle under varying climatic conditions. Responsibility for training personnel rests with the employer.

6.2.2 Truck drivers should start, drive, and stop their trucks smoothly to prevent the animals from being thrown off their feet.

6.2.3 Cattle in transit should not be subjected to physical injury when being moved.

6.2.4 Transport crews are responsible for the welfare of the cattle for the entire stage of transport that they have agreed to undertake.

6.2.5 Each truck load should be checked within the first 35 km after loading. When necessary, animal distribution in the load should be readjusted. All loads should be checked periodically while being transported.

6.2.6 Cattle should be transported from point of origin to final destination by the most direct route available, and transportation should be completed as soon as possible.

6.2.7 Ignorance is no excuse for inhumane handling of livestock. Employers have an obligation to train employees properly on humane handling, use of equipment, and care of livestock.

6.3 Vehicles

6.3.1 All vehicles used for transporting cattle should have sides that are secure, strong, and high enough to prevent cattle from jumping, falling, or being pushed out.

6.3.2 Vehicles and containers used for transporting cattle should be well constructed. They should have secure, smooth fittings, and they should be free of protruding bolt heads and any other sharp protrusions.

6.3.3 Provision must be made for the drainage or absorption of urine.

6.3.4 To avoid injury, vehicles should be constructed so that no part of an animal can protrude from the vehicle.

6.3.5 Portable ramps should be stable and should provide good traction for cattle. The sides should be high enough to prevent injury to animals.

6.4 Containers for transportation of dairy cattle

6.4.1 Unless dairy cattle can be seen easily from outside the containers, every container used to transport them must have a sign or symbol to indicate that it contains live animals and to show its upright position.

6.4.2 Containers used for transporting dairy cattle must be securely placed on vehicles to prevent them from moving during the journey.

6.4.3 Cattle should be provided with enough floor space to ensure that they are not crowded in a way that is likely to cause injury or suffering.

6.4.4 Each animal should be able to stand in its natural position without touching the ceiling or roof. (For space requirements during transportation see Appendix B.)

6.4.5 When transporting dairy cattle in containers, attention must be given to temperature, ventilation, facilities, and available space during the entire journey.

6.4.6 Containers that hold dairy cattle should be tilted as little as possible during all stages of loading and unloading. They should always be moved smoothly and never thrown or dropped.

6.4.7 Sudden changes in environment should be minimized during transportation, and dairy cattle should not be subjected to excessive, unfamiliar noise.

6.5 Loading and unloading

6.5.1 In a new situation or location, all normal, healthy cattle are alert and investigative. Every change or disturbance in their surroundings, such as noise, breezes, movement of objects, and flashes of light, should be avoided, as animals in unfamiliar situations are easily frightened.

6.5.2 The use of electric prods is discouraged. When prods are necessary to move cattle they must not be used on the genitals, anus, or face.

6.5.3 Cattle should not be loaded or unloaded in a way that causes avoidable injury or suffering. Ramps should be used; tilting the box of a dump truck is totally unacceptable.

6.5.4 Cattle are more easily loaded into vehicles if the alleyways and ramps do not have sharp turns that impede movement and that could cause injury. Ideally, loading and unloading paths and ramps should be curved, should have solid walls (with the inside wall slightly lower so that the animals can see the tops of the heads of their forerunners), and should be properly illuminated. When animals are handled with care, they feel that they are approaching the main body of the herd and thus insecurity and fear are reduced. The angle of loading ramps should not exceed 25°. When possible, loading and unloading docks should be elevated to be level with the vehicle so that cattle can step safely on or off the vehicle.

6.5.5 Ramps and chutes should be strong, should provide safe footing, and should have sides that are high enough to prevent cattle from falling or jumping off.

6.5.6 No gap should exist between the ramp, its sides, and the vehicle.

6.5.7 Whenever possible, the loading zone should be situated to safeguard against the spread of infection.

6.5.8 Vehicle doors and internal gates should be wide enough to permit cattle to pass through easily without bruising or injury.

6.5.9 Cattle of substantially different sizes or maturity must be separated from one another during transport.

6.5.10 Tethering devices must be removed immediately if they restrict breathing or otherwise cause the calves discomfort.

6.5.11 Excessive use of identification devices such as ear tags must be avoided. These devices should be removed where evidence of abuse exists. Back tags should be used for short-term or temporary identification.

6.6. Space requirements

6.6.1 Cattle should be provided with enough floor space in a vehicle to ensure that they are not crowded in a way that is likely to cause injury or suffering.

6.6.2 Each animal should be able to stand in its natural position, without touching the deck or roof of the vehicle.

6.7 Protecting cattle during transit

6.7.1 Vehicles used to transport cattle should be cleaned, sanitized, and equipped with enough suitable fresh bedding material before each new load. When loads are assembled from a number of sources, these steps should be taken before the first animals are picked up.

6.7.2 Vehicles and containers should be thoroughly cleaned and sanitized after each shipment to prevent the spread of disease. All commercial unloading facilities should provide an appropriate area, suitably equipped, where cleaning can be done during all seasons.

6.7.3 Vehicle and container floors that do not have secure footing for cattle should be provided with materials such as sand, shavings, or sawdust for safe and secure footholds. Calves under 4 weeks of age should not be bedded in shavings or sawdust.

6.7.4 Cattle must be protected during transit to prevent suffering caused by exposure to severe weather conditions.

6.8 Food, water, and rest for cattle in transit

6.8.1 During transportation, cattle should be provided with food and water every 48 h.

Milking cattle should not be deprived of food and water for longer than 12 h.

6.8.2 Calves that are too young to be fed exclusively on hay and grain should be provided with suitable food and water at least every 18 h.

6.8.3 Cattle that are unloaded for food, water, and rest must be placed in a suitably covered shelter, must be provided with enough food and potable water, and must be allowed to rest for at least 5 h.

6.8.4 When lactating cows are transported, they should be milked as required. The stage of lactation and the milk yield of the cows indicate the necessary frequency of the milking.

6.8.5 Transporters must maintain, or have access to, facilities that allow cattle to be fed, watered, and cared for and that offer protection from adverse weather conditions.

6.8.6 The following criteria must be met when cattle are being transported by ship:

- Cattle must be provided with enough food and water for the expected duration of the trip.
- An additional 2-day supply of food and water must be provided for each estimated 8 days of the voyage.
- The food and water must be stored under sanitary conditions and must not be exposed to extreme weather conditions.
- A sufficient number of outlets must be available to provide water for the cattle.

6.9 Unfit cattle

6.9.1 An unfit animal is defined as a sick, fatigued, or injured animal that cannot be transported without undue suffering, unless special precautions are taken.

6.9.2 Only cattle fit to travel should be considered for transportation, unless special precautions are taken to ensure that the animal does not suffer.

6.9.3 If, during ground transit, an animal becomes unfit for further travel, it should be taken to the nearest appropriate place for treatment.

6.9.4 An unfit animal that can be transported should be kept separate from other animals.

6.9.5 Unfit cattle should be loaded or unloaded in a way that causes them the least suffering.

6.9.6 When loading and unloading trucks, unfit cattle should be put on last and taken off first.

6.9.7 If during air or sea transportation an animal dies, is killed, or is seriously injured the carrier must make a report to the veterinarian at the port of embarkation, giving details of the death or injury.

6.10 Pregnant cattle

6.10.1 Calving is a natural phenomenon and as such the timing cannot be precisely predicted. Consideration should be given to curtailing long-distance travel during expected calving time and immediately thereafter.

6.11 Precautions in cold weather

6.11.1 All cattle must be protected from cold winds during travel because wind chill can cause death (see Appendix C).

6.11.2 When calves under 4 weeks of age are moved, an adequate supply of straw keeps them dry and comfortable. Since wet bedding tends to freeze, it should be removed from the truck after each trip.

6.11.3 Calves have little natural protection from the cold and suffer from frostbite quickly; special precautions are therefore necessary to protect them.

6.11.4 During winter travel, openings that allow drafts to enter the vehicle box should be covered to protect the cattle from cold crosswinds. Although some air should be allowed to pass over the bodies of cattle, all front vents of trucks should be closed.

6.11.5 Weather conditions should be observed carefully and ventilation adjusted accordingly. Too much cold air entering the vehicle can cause animals to suffer from frostbite, but not enough air can cause suffocation. Both load and ventilation should be checked during transit.

6.11.6 Freezing rain and temperatures near the freezing mark can cause sickness, and therefore steps should be taken to protect cattle from the elements. This is especially crucial for calves.

6.11.7 In cold weather, cattle should be inspected approximately every 2 h. Every attempt should be made to maintain a draft-free environment during transit. Warming and cooling can cause severe respiratory problems.

6.11.8 In the event of a vehicle breakdown, traffic accident, or other delay during transit, appropriate action is necessary to ensure the well-being of the cattle (see Appendix A).

6.12 Precautions in hot and humid weather

6.12.1 During hot and humid weather, extra precautions should be taken to avoid stress or death caused by high temperatures or high humidity.

6.12.2 Vehicles that contain animals should not be parked in direct sunlight.

6.12.3 Calves should be fed immediately (within 5 h) before transportation.

6.12.4 Sand should be used in trucks where there is inadequate footing. Sand that contains materials known to be irritating or harmful to the animals (e.g., fertilizer, ash) should never be used.

6.12.5 Loading density should be reduced in hot and humid weather.

6.12.6 Regardless of the type of vehicle used, adequate airflow throughout the vehicle must be provided to keep cattle comfortable.

6.12.7 Cattle should be loaded and unloaded promptly. To prevent rapid buildup of heat inside the vehicle, frequency and length of stops should be kept to a minimum during transit.

6.12.8 In the event of a vehicle breakdown, traffic accident, or other delay, prescribed emergency procedures should be followed (see Appendix A). In addition, the shipper or consignee should be contacted.

6.13 Transportation stress

6.13.1 In hot weather, cattle should be handled carefully because exercise increases stress. Wide temperature fluctuations between day and night also increase stress.

6.13.2 Care is essential when forced movement of a stressed animal is necessary. Every animal should be treated with extreme patience and should be allowed to rest when overexerted.

6.13.3 The transfer of cattle from one sale facility to another to be reoffered for sale should be avoided.

Section 7. Assembly yards, sales yards, and processing facilities

7.1 Facilities

7.1.1 Assembly yards and sales yards should be constructed to prevent cattle from slipping, falling, and injuring themselves. These areas should be regularly cleaned, disinfected, and supplied with fresh bedding.

7.1.2 Assembly yards and sales yards should be properly maintained and must be free from any objects such as protruding nails, bolts, or sharp corners that could injure the cattle or cause them discomfort.

7.1.3 All facilities must be covered and properly ventilated, and cattle must be protected against extreme weather conditions. All assembly yards must provide drinking water.

7.1.4 Uncovered pens may be used to hold any overflow of cattle; however, the welfare of animals held in such pens must be given careful attention, and the pens may be used only for brief staging periods under suitable climatic conditions.

7.1.5 One-way gates that prevent cattle from reversing direction are highly desirable.

7.1.6 All floors of pens, alleyways, and chutes must be paved, properly drained, scored, or treated to prevent slipping and must be graded gently to provide good footing. The slope of the floor in individual holding units should not be less than 2% or more than 4% (2–4 cm/m). Drainage grates, where required, should be at the side of the pens, alleyways, or chutes.

Ramps should not be steeper than 25°.

7.1.7 Alleyways, loading ramps, unloading ramps, and the entrance to transport vehicles should be well illuminated.

7.2 Unfit cattle

7.2.1 Each crippled, lame, sick, weak, or fatigued animal should be identified and documented as unfit.

7.2.2 Unfit cattle must be off-loaded without causing the animal undue pain and suffering.

7.2.3 Unfit cattle must be placed in a segregated pen. These animals must be kept comfortable, fed (if necessary), and watered. They must be provided with medical treatment as soon as possible or humanely destroyed.

7.3 Holding and handling

7.3.1 Pens should contain enough space to enable all cattle in them to lie down at the same time.

7.3.2 Cattle should be unloaded, penned, held, and loaded in a way that exposes them to a minimum of discomfort and excitement.

7.3.3 Pens should be available in various sizes to minimize the need to mix various lots of cattle. Adjustable dividing gates should be installed in the larger pens to help reduce mixing.

7.3.4 Pens should be designed to facilitate the movement of one-way traffic and should have a separate entrance and exit.

7.3.5 The use of electric prods, canvas slappers, and other similar devices should be avoided. Direct 120-V circuit prods are not permitted.

7.3.6 Prods must not be used on the genitals, anus, or face of cattle.

7.3.7 Excessive use of ear tags must be avoided. Back tags should be used for short-term or temporary identification.

7.4 Education of personnel

7.4.1 Ignorance is no excuse for inhumane handling of livestock. Employers have an obligation to train employees properly on humane handling, equipment use, and livestock care.

7.4.2 Employers should hold group discussions with their employees to instruct them on their responsibilities and obligations. Slides, pamphlets, and bulletins on these topics should be made available to employees.

7.4.3 A knowledge of basic animal behavior helps employees to become more tolerant and understanding of the functions of their job.

7.5 Slaughter

7.5.1 The most important factors in ensuring that slaughtering is humane are the selection and training of the persons doing the stunning.

7.5.2 No cattle shall be slaughtered without first being rendered unconscious by an experienced person using an approved, humane method (Meat Inspection Act).

7.5.3 Hoisting or bleeding of cattle not rendered unconscious is illegal (Meat Inspection Act).

7.5.4 Animals that are ritually slaughtered in accordance with Jewish or Islamic law, and are slaughtered without stunning, must be properly restrained and the slaughter must be carried out by experienced persons. Such slaughter shall be performed by a single cut that shall result in the rapid, simultaneous, and complete severance of the jugular vein and carotid arteries so as to cause rapid unconsciousness and exsanguination.

7.5.5 Stunning systems must be well maintained and must be used only by operators who are properly trained and who have the physical ability to apply such systems without causing the animals avoidable pain and suffering, so that unconsciousness of the animals results immediately.

7.5.6 The use of electrical reversible stunning systems requires an expeditious bleed-out to prevent a return to consciousness. The interval between stunning and sticking is recommended to be not more than 30 s.

Appendix A Emergency procedures (transportation)

Emergency procedures to be followed by drivers in the event of a breakdown, an accident, or any other delay during transit.

Please post in trucks

1. Telephone home office immediately to report the emergency situation.

2. During business hours, telephone the nearest slaughterhouse as well as the manager of the receiving plant.

3. Telephone the packing plant. (Attach night telephone numbers.)

4. If necessary, arrange for the use of another vehicle to move the load to a sheltered area or to the plant.

5. During extremely hot or cold weather, seek shelter for the load until the emergency situation is over.

6. Seek the advice of a veterinarian in the event of distressed or seriously injured cattle.

7. Do something! Use common sense. The comfort of the animals must be kept in mind at all times.

Appendix B Space requirements during transportation

Area	Weight of bob calves (kg)						Weight of finished calves (kg)						
	34–45	45–57	57–68	68–80	80–91	91–113	113–135	135–158	158–180	180–203	203–225	225–248	248–270
Square metre per animal	0.18	0.22	0.26	0.30	0.34	0.40	0.43	0.47	0.50	0.55	0.61	0.66	0.70
Square feet per animal	1.9	2.3	2.75	3.2	3.65	4.20	4.55	5.0	5.35	5.9	6.5	7.08	7.50
Half–ton truck, 3.7 m^2 (5 ft x 8 ft = 40 ft^2)	21	17	15	13	11	10	9	8	8	7	6	6	5
One–ton truck, 6.7 m^2 (9 ft x 8 ft = 72 ft^2)	38	31	26	23	20	17	16	14	14	12	11	10	10
Stake truck, 8.9 m^2 (12 ft x 8 ft = 96 ft^2)	50	42	35	30	26	23	21	19	18	16	15	14	13
Stake truck, 11.1 m^2 (15 ft x 8 ft = 120 pi^2)	63	52	44	38	33	29	26	24	22	20	19	17	16
Stake truck, 14.8 m^2 (20 ft x 8 ft = 160 ft^2)	84	70	58	50	44	38	35	32	30	27	25	23	21
Trailer, 17.8m^2 (24 ft x 8 ft = 192 ft^2)	101	84	70	60	53	46	42	38	36	33	30	27	26
Trailer, 29.7 m^2 (40 ft x 8 ft = 320 ft^2)	168	139	116	100	88	76	70	64	60	54	49	45	43
Trailer, 33.4 m^2 (45 ft x 8 ft = 360 ft^2)	189	157	131	113	99	86	79	72	67	61	55	51	48
Possum-belly trailers (POT)	(three decks)						(two decks)						
16.9 m long, 47 m^2 (43 ft long, 506 ft^2)	266	220	184	158	139								
16.9 m long, 47 m^2 (43 ft long, 506 ft^2)						120	111	101	95	85	78	72	68
17.7 m long, 49 m^2 (45 ft long, 531 ft^2)	280	231	193	166	145								
17.7 m long, 49 m^2 (45 ft long, 531 ft^2)						126	117	106	99	90	82	75	71

Appendix C Wind-chill factors

The following is a list of some actual air temperatures, wind speeds, and resulting wind-chill factors that can adversely affect unprotected cattle in transit.

Wind speed (km/h)	Actual air temperature (°C)						
	10	4	−1	−7	−12	−18	−23
	Wind-chill factor						
8	9	2	−3	−8	−15	−21	−26
16	4	−2	−8	−15	−22	−29	−34
24	2	−5	−12	−21	−28	−34	−41
32	0	−8	−16	−23	−31	−37	−45
40	−1	−9	−18	−26	−33	−39	−48
48	−2	−11	−21	−28	−36	−42	−51
56	−3	−12	−21	−29	−37	−44	−54
64	−3	−12	−22	−29	−38	−47	−56
72	−4	−13	−22	−30	−39	−48	−57
80	−4	−13	−23	−31	−40	−48	−58

Appendix D Participants

Representatives of the following organizations contributed to the drafting of this code. However, the code does not necessarily have the unequivocal endorsement of any agency.

Organization	*Representative*
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