GOOD MANUFACTURING PRACTICES FOR
CATTLE AND BUFFALO ABATTOIR

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Thai Agricultural Standard (TAS) on Good Manufacturing Practices for Cattle and Buffalo Abattoir is the provision for abattoir certification and for the use as the practical guidelines to the abattoir operators, which covers procedures starting from receiving live animals to the market place in order to provide safe and quality product that is fit for consumption and is acceptable domestically and internationally.

The establishment of this standard is based on the information of the following documents:

National Bureau of Agricultural Commodity and Food Standards (ACFS). A collaborative project with the Faculty of Veterinary Medicine, Kasetsart University on the study of criteria on the good manufacturing practices for cattle, buffalo, and ostrich abattoir.
The resolution of the 2/2550 session of the National Committee on Agricultural Commodity and Food Standards dated on 28 August B.E.2550 (2007) endorsed the Thai Agricultural Commodity and Food Standard entitled Good Manufacturing Practice for Cattle and Buffalo Abattoir to improve the quality, facilitate trade and protect consumers’ health.

By virtue of the Cabinet Resolution on Appointment and Authorization of the National Committee on Agricultural Commodity and Food Standards dated 3 April B.E.2550 (2007), the notification on Thai Agricultural Commodity and Food Standard entitled Good Manufacturing Practice for Cattle and Buffalo Abattoir is hereby issued as a voluntary standard. The details of which are attached herewith.

Notified on 26 September B.E.2550 (2007)

Professor Thira Sutabutra
Minister of the Ministry of Agriculture and Cooperatives
Chairperson of the National Committee on Agricultural Commodity and Food Standards
1. SCOPE

1.1 Thai agricultural standard (TAS) on good manufacturing practices for cattle and buffalo abattoir establishes the essential details for the transportation of cattle and buffalo from farm to abattoir, humane slaughtering method, carcass management, good hygienic practices and transportation for carcass, beef and meat, and products thereof from abattoir to market place for consumption.

1.2 This Thai Agricultural Standard shall be used in conjunction with the Thai Agricultural Standard on Good Manufacturing Practices for Abattoir (TAS 9004), the Thai Agricultural Standard on Beef (TAS 6001) and the Thai Agricultural Standard on Buffalo Meat (TAS 6002).

2. DEFINITIONS

For the purpose of this standard:

2.1 Cattle and buffalo means the large ruminants in the family of Bovidae.

2.2 Cattle and buffalo abattoir means any premise and building established for slaughtering of cattle and buffalo and may include beef and meat cutting in order to produce carcasses and products thereof for consumption.

2.3 Cattle and buffalo carcass means whole body of cattle and buffalo (removing of blood, head, skin and visceral organs) that are humanely slaughtered for human consumption.

2.4 Beef and buffalo meat means parts of cattle and buffalo carcasses, especially skeletal muscle that is safe for consumption, and may pass the chilling process but does not pass the preservation process.

2.5 Products mean other parts of animal which are not meat and processed but can be used as food such as blood, tongue, stomach.

2.6 Cattle and buffalo head means head of cattle and buffalo that is separated from the carcass of cattle and buffalo at the first cervical vertebrae.

2.7 Cattle and buffalo hide means the skin that is taken out of cattle and buffalo after slaughtering.

2.8 White offal means esophagus, stomach, intestines and reproductive organs.
2.9 **Red offal** means heart, liver, kidney, spleen, trachea and lungs.

2.10 **Stunning** means methods that knock out animal and make it unconscious and insensible to pain long enough until completely bleeding out.

2.11 **Humane slaughtering** means the slaughtering methods without torturing animals.

2.12 **Transportation for live cattle and buffalo** means moving cattle and buffalo from farm to abattoir using appropriate vehicle.

2.13 **Vehicle for live cattle and buffalo** means vehicle such as truck including trailer for transportation of cattle and buffalo.

2.14 **Cutting** means cutting animal carcass into desired parts.

2.15 **Transportation for cattle and buffalo carcass, beef and meat, and products thereof** means moving of cattle and buffalo carcass, beef and buffalo meat, and products using vehicle from abattoir to market place.

2.16 **Vehicle for cattle and buffalo carcass, beef and meat, and products** means a temperature controlled vehicle used for transportation of cattle and buffalo carcass, beef and meat, and products thereof.

2.17 **Package** means packaging or container used for packing cattle and buffalo carcass, beef and meat, and products thereof.

2.18 **Official inspector** means veterinarian or person who is authorized by Director General of the Department of Livestock Development or local administration to have responsibilities to inspect diseases in animals or their meat, in accordance with the law pertaining to Controlling of Abattoir and Selling Fresh Meat.

2.19 **Competent person** means person who is authorized by the Minister of the Ministry of Agriculture and Cooperatives, Director General of the Department of Livestock Development or local administration in accordance with the law pertaining to Controlling of Abattoir and Selling Fresh Meat.

2.20 **Visual inspection** means an inspection of any external physical appearances of an item, for examples meat, product, or apparent environment conditions. This is basically examined by eyes but any other sensory evaluation may be applied, such as touching and smelling; or additional tools may be applied such as magnifying lens, depending on quality factors in question. Subsequently, physical appearances and environmental conditions shall be assessed so as to see if the criteria are fully met, which may include observation, interview of operation or working procedures.
2.21 **Ante-mortem inspection** means physical examination of animals before slaughtering using any means by official inspector for food safety and fit for consumption.

2.22 **Post-mortem inspection** means examination of carcass, products, offal and head using any means by official inspector for food safety and fit for consumption.

### 3. REQUIREMENTS AND INSPECTION METHODS

Requirements and inspection methods for Good Manufacturing Practices for Cattle and Buffalo Abattoir shall be as Table 1 and in TAS 9004, Section 3 Procedures, Requirement and Inspection Methods.

<table>
<thead>
<tr>
<th>Items</th>
<th>Requirements</th>
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</table>
| 1. Transportation of live cattle and buffalo | 1.1 Vehicle shall be sturdy with appropriate space.  
1.2 Transport shall be in accordance with the relevant laws enforced by the Department of Livestock Development.  
1.3 Cattle and buffalo shall be prevented from injury or stress during transportation.  
1.4 Unhealthy or sick animals shall not be transported together with healthy ones.  
1.5 Vehicle shall be cleaned and disinfected every time after use. | Visual inspection and check the relevant document |
| 2. Receiving live cattle and buffalo | 2.1 Animals shall arrive at abattoir for at least 4 hours prior to slaughtering.  
2.2 Animals shall not be starved longer than 24 consecutive hours.  
2.3 Animals shall be examined before getting into the lairage.  
2.4 Sick or suspected sick animals shall be separated in designated pen and reported to official inspector.  
2.5 Severely injured animals shall be immediately humanely slaughtered by separating from normal production line. | Visual inspection and check records |
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| 3. Cattle and buffalo lairage and examination of animals before slaughtering | 3.1 The size of lairage shall be appropriate with the number of animals which shall not be less than 2 m²/head.  
3.2 Construction material shall be durable, smooth, no sharp or breakable part, not caused injury to animals and non-slippery floor.  
3.3 Water supply for animals shall be sufficient.  
3.4 Ante-mortem inspection shall be performed.  
3.5 There shall be a walkway from lairage to the stunning room.  
3.6 Animals shall be cleaned before slaughtering.  
3.7 Lairage shall be cleaned and disinfected after slaughtering all of animals and shall have adequate water supply to clean the area. | Visual inspection and check records |
| 4. Slaughter                                                          | 4.1 Humanely slaughtering methods shall be performed.  
4.2 Animals shall be stunned before slaughtering or used the methods following ritual slaughter or religious provisions.  
4.3 In case of using railing system, hind limbs of animals shall be hanged on the hoist immediately after stunning.  
4.4 Animals shall be completely bled for 5-6 minutes.  
4.5 Knife or equipment for bleeding shall be cleaned and disinfected every time before and after use.  
4.6 The operation area shall be periodically cleaned during and after slaughtering. | Visual inspection                  |
<p>| 5. Head removal                                                       | 5.1 Head shall be removed from the body at the 1st cervical vertebrae and shall have indication of head of such carcass to facilitate further inspection.                                                           | Visual inspection                  |</p>
<table>
<thead>
<tr>
<th>Items</th>
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<tbody>
<tr>
<td>6. Docking and carpal and tarsal cutting</td>
<td>6.1 Docking shall be done between 1st coccygeal and last lumbar vertebra.</td>
<td>Visual inspection</td>
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<td></td>
<td>6.2 Carpal and tarsal cutting shall be done at carpal and tarsal joint and</td>
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<td>shall keep joints in a container to avoid contacting to the floor.</td>
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<td>7. Dehiding</td>
<td>7.1 Dehiding by knife shall be started at midline of the thorax and abdomen</td>
<td>Visual inspection</td>
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<td></td>
<td>and subsequently of all 4 legs and back, respectively or by using dehiding</td>
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<td>machine.</td>
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<td>7.2 Dehiding shall be done by avoiding contact of the carcass to the floor or</td>
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<td>contamination from hide to carcass.</td>
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<td>7.3 Hide shall be placed in a container for taking away from meat operation</td>
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<td></td>
<td>area.</td>
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<td>8. Evisceration</td>
<td>8.1 All offal shall be completely removed.</td>
<td>Visual inspection and check records</td>
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<td>8.2 In case of visceral rupture, contaminated carcass shall be immediately</td>
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<td>cleaned or removed but water use is prohibited.</td>
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<td>8.3 Post-mortem inspection shall be performed.</td>
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<td>9. Half cutting</td>
<td>9.1 Carcass shall be cut in half through vertebral column and taken out</td>
<td>Visual inspection</td>
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<td>spinal cord. Spinal cord shall be discarded appropriately.</td>
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<td>10. Carcass cleaning</td>
<td>10.1 Carcass shall be cleaned thoroughly after the process of bleeding,</td>
<td>Visual inspection</td>
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<td>evisceration, and half cutting</td>
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<td>11. Carcass marking</td>
<td>11.1 Carcass shall be stamped with certified mark and other certification</td>
<td>Inspection of mark</td>
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<td>mark.</td>
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<td>12. Chilling</td>
<td>12.1 Carcass shall be cooled down to less than 7 °C at the center of the meat</td>
<td>Visual inspection, measure temperature</td>
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<td>before sale or during storing before sale.</td>
<td>and check record</td>
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<td>12.2 Temperature of carcass shall be recorded.</td>
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<td>12.3 Chilling room for keeping carcass shall be free from condensed water</td>
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<td>drop to contact the carcass.</td>
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<td>Items</td>
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| 13. Cutting                               | 13.1 All cutting utensils shall be cleaned.  
13.2 Cutting area shall be separated from other production line and has strict control of entry and exit of workers.                                      | Visual inspection                     |
| 14. Packaging                             | 14.1 Container shall be strong and safe for containing the food and durable for transportation.  
14.2 Packaging shall have legible label with information according to Appendix A 14.4.                                                                | Visual inspection                     |
| 15. Transportation for cattle and buffalo carcass, beef and buffalo meat and products | 15.1 Vehicle shall have temperature controlling system to give core temperature of the carcass not more than 7 °C at all time and shall prevent cross contamination.  
15.2 Do not use the same vehicle transporting live animals for transporting carcass, beef and buffalo meat and products.  
15.3 Vehicle or container shall be cleaned before and after transportation.                                         | Visual inspection, check records and temperature measuring |
| 16. Waste water treatment                 | 16.1 Waste water treatment system for improving the quality of the waste water in accordance with the relevant laws and regulations shall be performed                                                       | Visual inspection and check records   |
| 17. Principle of general hygiene          | 17.1 Hygienic practices for production as shown in Appendix B.1  
17.2 Personal hygiene as shown in Appendix B.2                                                                                                    | Visual inspection and check records   |
| 18. Slaughtering procedures               | 18.1 They shall be followed as Appendix C and shall prevent cross contamination.                                                                                                                             | Inspection of slaughtering procedures |
4. GUIDANCES ON THE GOOD MANUFACTURING PRACTICES FOR CATTLE AND BUFFALO ABATTOIR

Recommendations for good manufacturing practices for cattle and buffalo abattoir aim to provide operator to use as guidance in order to produce carcass, beef and meat, and products thereof that are safe and fit for consumption. The details of such recommendations are explained in Appendix A, B, C and D, respectively.
A.1 TRANSPORTATION OF LIVE CATTLE AND BUFFALO

A.1.1 Vehicle for transportation of live cattle and buffalo

A.1.1.1 Vehicle shall be sturdy and appropriate for transportation of live animals.
A.1.1.2 Vehicle shall have adequate ventilation, non-slippery floor, and preventive measures against water and waste drainage during the transportation.
A.1.1.3 Side walls of the vehicle contacting to animals shall be made of smooth surface material, high enough to prevent animals jumping off and designed to enable opening.
A1.1.4 Floor and side walls of vehicle shall not have slits or holes that any parts of animals can protrude out of the vehicle.
A1.1.5 Vehicle should have enough space for each animal to stand during transportation, such that it shall not be too crowded and not have too much space that animal can turn around. The space for adult animals shall not be less than 1 m²/head.

A1.2 Method of transportation

A1.2.1 Transportation shall be done in accordance with the regulations enforced by the Department of Livestock Development.
A1.2.2 There should be a loading ramp for animals onto the vehicle where animal welfare shall be taken into account.
A1.2.3 During transport, any risk of injury to animals shall be avoided, such as driving smoothly and no sudden start and stop.
A1.2.4 Unhealthy or sick animals shall not be transported together with healthy ones.
A1.2.5 Transport of different size of animals, horned or dehorned animals, as well as dominant males together with other males shall be avoided.
A1.2.6 Cattle and buffalo should be transported during dawn or at night to avoid heat. In case of very hot weather, there should be methods to reduce the heat. In case of sunlight or raining, there shall be shading to protect animals.
A1.2.7 The shortest route for transport should be required, not to exceed 8 continuous hours and the total period shall not exceed 36 hours.
A1.2.8 During transport, animals shall be periodically monitored. If any harm may occur to the animals, the transporter should immediately respond.
A1.2.9 Vehicle shall be cleaned and disinfected after unloading each time.
A.2 RECEIVING LIVE CATTLE AND BUFFALO

A.2.1 Animals shall arrive at abattoir at least 4 hours prior to slaughtering for resting.

A.2.2 Animals shall be starved for at least 4 hours but not more than 24 hours.

A.2.3 When animals arrive at abattoir, the official inspector shall check the legal document.

A.2.4 There should be the unloading ramp between vehicle and lairage where animal welfare shall be taken into account.

A.2.5 Sick or suspected sick animal shall be separated and quarantined in the sick animal pen and the authority shall be informed.

A.2.6 If any animal severely injured, it shall be humanely slaughtered immediately to avoid from suffering and separate from the normal production line.

A.3 LAIRAGE/RESTING PEN

A.3.1 Lairage should have shading for protecting animals from sunlight and rain, good ventilation, suitable temperature and water repellent wall such as concrete wall, or smooth and rustless iron pipe wall with 150 cm height, and non-slippery and slightly tilted floor.

A.3.2 Lairage for sick animal shall be separated from lairage for normal ones and water drainage system shall not pass through the lairage and production line.

A.3.3 There shall be sufficient water supply for animals at all time and the density of lairage shall not be less than 2 m²/animal.

A.3.4 Ante-mortem inspection shall be performed not to exceed 24 hours prior to slaughtering such as respiration, movement, weighting each animal and recording of the ante-mortem inspection shall be kept by the official inspector. If slaughtering cannot be done as scheduled, such animals shall be supplied with feed and water. In this case, ante-mortem inspection shall be repeated before slaughtering.

A.3.5 Every cattle and buffalo shall be cleaned by spraying with water before slaughtering.

A.3.6 There shall be a walkway connecting from lairage to slaughtering room which should be narrow to prevent animal from turning around, normally not wider than 76 cm (depending on breed and size of animals).

A.3.7 Keep ordering of slaughtering shall be done.

A.3.8 Lairage shall be cleaned and disinfected after each slaughtering.

A.4 SLAUGHTER

A.4.1 Stunning

A.4.1.1 Cattle and buffalo should be taken into restraint cage which shall have open and close door or barrier to prevent cattle and buffalo back off the restraint cage.
A.4.1.2 Check stunning equipment to ensure that it works properly before use. Stunning method is to use a captive bolt pistol. The pistol is to be forcefully strike onto the forehead, at the intersection of imaginary lines connecting eyes and the base of horns, without damaging brain tissue. Other methods advised by the authority as well as those following ritual slaughter or religious provisions can also be applied.

A.4.2 Bleeding

A.4.2.1 Bleeding shall be done immediately after stunning. Stunned animals shall be hung on the hoist with the head upside down or laid on a table.

A.4.2.2 Knife or equipment for bleeding shall be cleaned and disinfected, such as dipping in hot water with temperature not less than 82°C, before being used with individual animal and after the whole operation.

A.4.2.3 Complete bleeding takes approximately 5-6 minutes. Clean blood container is required in the case of use for consumption.

A.4.2.4 Esophagus shall be firmly tightened to prevent the reflux of feed from stomach.

A.4.2.5 Equipments, utensils and the bleeding area shall be periodically cleaned. A complete cleaning shall be done after each operation.

A.5 HEAD REMOVAL

A.5.1 Head shall be removed at the first cervical vertebrae and shall have the same indication of head to such carcass to facilitate further post-mortem inspection by the official inspector.

A.5.2 After head inspection, brain shall be removed and discard properly and shall not be used for consumption or further processing.

A.6 DOCKING AND CARPAL AND TARSAL CUTTING

A.6.1 Docking shall be done between the last lumbar and the first coccygeal vertebrae.

A.6.2 Remove the tail’s skin and place the tail in the container without touching the floor.

A.6.3 Tarsal cutting shall be done by cutting at tarsal joint or tarsus. Carpal cutting shall be done by cutting at carpal joint or carpus. Tarsus or carpus shall be separated in the container without touching the floor.

A.6.4 If the carcass is hung, grambrel or hook shall be used to hook at the achilles tendon for hoisting up onto the rail.

A.7 DEHIDING

A.7.1 Dehiding should be started at the midline at thorax and abdomen and subsequently dehiding all four legs and back or using dehiding equipment by pulling skin out of the body.

A.7.2 Using hook at the rim of anus then using dehiding knife to scoop out the anus in order to separate from the carcass, the anus shall be firmly tightened or covered of plastic bag.
before tightening the anus or using equipment plugging into the anus to prevent dirty content or feces to contaminate the carcass.

A.7.3 Preventing any contamination from skin to meat shall be performed.

A.7.4 Container for dehiding skin shall be provided in order to take the skin out of the meat operation area.

A.7.5 After finishing the operation, equipment, utensils and working area shall be cleaned such as floor, wall, knife, chain and dehiding equipment.

A.8 EVISCERATION

A.8.1 Using knife to open the abdomen to thorax by letting the hilt inside the peritoneal cavity and the sharp side of the blade facing peritoneum and to take out the white offal and place them in the offal container.

A.8.2 Using saw or knife to open thorax and to take out red offal.

A.8.3 In case of visceral rupture, do not use water to wash but allow cutting the contaminated part or use other means to prevent cross contamination to other parts of the carcass.

A.8.4 Both white and red offal shall be placed beside such carcass or there is the same indication of the offal to such carcass to facilitate further post-mortem inspection by the official inspector.

A.8.5 Official inspector shall examine and make a record of meat and products. Culling off the carcass and products shall be authorised by the official inspector.

A.9 HALF CUTTING

A.9.1 For half cutting of carcass, saw or knife shall be used by making a straight line cut at the mid of vertebral column.

A.9.2 Spinal cord of the carcass shall be removed and discarded properly and it shall not be used for consumption or further processing.

A.9.3 Remove small pieces of meat and bone from the cutting process out of the carcass.

A.10 CARCASS CLEANING

After bleeding, evisceration, and half cutting, the whole carcass shall be cleaned to eliminate all visible dirt.

A.11 CARCASS MARKING

After cleaning, carcass shall be stamped for certification of post-mortem inspection and other certified mark in accordance with criteria and regulation of the law pertaining to controlling of Abattoir and Selling Fresh Meat
A.12 CHILLING

A.12.1 After cleaning, carcass shall be transferred to the chilling room immediately.

A.12.2 Chilling the carcass, the core temperature of the round muscle shall be set not to exceed 7 °C within 24 hours.

A.12.3 Systematic ordering of the carcass shall be arranged by the principle of first in-first out.

A.12.4 The carcass shall be arranged with space in between to allow sufficient flow of cool air.

A.12.5 The carcass storage room should be provided with dehumidifying system to prevent condensation.

A.12.6 Chilling room is clean and shall be cleaned regularly, no pieces of meat as well as blood on the floor, and also no water accumulation.

A.12.7 Operator shall examine carcass stored including monitoring and recording of both carcass and room temperatures.

A.12.8 There shall be strictly controlling worker in and out the chilling room and printing unauthorized person to the chilling room.

A.12.9 There shall be opening mechanism and alarm set inside the chilling room.

A.13 CUTTING

A.13.1 Cutting and deboning should be done after chilling.

A.13.2 Cutting shall be done in the cutting room that can control the core temperature of the meat not more than 7 °C where the carcass may be directly transferred to the packing section or to the another specific cut section.

A.13.3 Cutting shall be done quickly to prevent the growth of microorganism.

A.13.4 In case of using conveyor for beef and meat, conveyor belt and container shall be cleaned without blood. If there is blood, the container shall be cleaned with clean water and wiped out immediately with wiper blade. The use of sponge is strictly prohibited.

A.13.5 During cutting, there shall not be over piling up of meat on the conveyor belt.

A.13.6 Each operator shall wash their hands with soap and disinfectant regularly.

A.13.7 Entry and exit of the cutting room shall be strictly controlled, in particular those not directly involved in the operation shall be strictly prohibited.

A.13.8 Knife and utensils shall be cleaned and disinfected.

A.13.9 Grading of beef and meat shall follow the provisions of the TAS 6001 and TAS 6002.
A.14 PACKAGING

A.14.1 Packing shall be done quickly at the controlled core temperature of the carcass, beef and meat and products thereof not more than 7 °C at all times until transport.

A.14.2 Container shall be cleaned. The plastic container shall meet the standard requirements of the Food Act.

A.14.3 Container shall be durable for transport.

A.14.4 There shall be label on the package for every unit with legible information showing details as follows:

1. Type of carcass, meat or products of cattle and buffalo.
2. Net weight by gram or kilogram.
3. Date of production (date of slaughtering) and date of best before
4. Storage instruction
5. Name and address of producer or distributor, or trade mark

A.14.5 In case of packaging made of material that cannot be cleaned, the packaging room shall be separated from other rooms with the design to prevent dust, insect and rat.

A.15 TRANSPORTATION OF CARCASS, BEEF AND MEAT, AND PRODUCTS THEREOF

A.15.1 Vehicle for transport shall be able to control the temperature with the core temperature of the meat not more than 7 °C at all times and prevent contamination of the carcass, beef and meat and products thereof.

A.15.2 Moving of carcass, beef and meat, and products thereof shall be carefully done without contacting wall and floor of the vehicle. If covering material is provided for beef and meat, it shall be protected from tearing.

A.15.3 Vehicle door or temperature controlled container of the carcass, beef and meat, and products thereof shall be tightly closed, if necessary it shall be locked or tightened with wire or other materials with a sign of not open during the transport.

A.15.4 Vehicle for transport of live animals shall not be used for carcass, beef and meat, and products thereof.

A.15.5 Vehicle shall be cleaned and disinfected before and after transportation.

A.16 WATER WASTE TREATMENT

There shall be a waste water treatment system for improving the quality of waste water in accordance with the relevant laws.
APPENDIX B

GENERAL HYGIENE
(Table 1, Item 17 and Section 4)

B.1 HYGIENIC PROVISIONS

B.1.1 Production process shall be controlled in accordance with the procedures of the good manufacturing practices for cattle and buffalo abattoir in Appendix C.

B.1.2 Cleanliness before production shall be inspected and recorded.

B.1.3 Efficient prevention and eradication of insect and disease carriers shall be done both inside and outside the production building.

B.1.4 The production area, equipment, machines and tools shall be maintained and cleaned before and after operation by appropriate and efficient methods, especially food contacting surface.

B.1.5 Adequate hand washing facilities.

B.1.6 Cleaning room for container and equipment shall have adequate space as appropriate proportion with container and equipment to be cleaned and shall be located at specific area of the building.

B.1.7 Washing tub for cleaning of container and equipment shall have appropriate size.

B.1.8 Storage area of materials, containers, equipment, tools or chemicals shall be provided and not cause or be the source of contamination.

B.1.9 Storage area for materials and equipments such as packaging materials, seasoning, worker clothes, detergent, and disinfectant shall be separated from each other and be locked.

B.1.10 Chemicals shall be separately kept from the production area and have clear indication.

B.1.11 Trash bin with lid shall be placed at certain place. Trash shall be discarded after each work shift and it shall not be done during production because it may cause contamination.

B.1.12 Cleaning the building including installed equipment before production, resting period and after production shall be done. Cleaning after the last production shall be properly done and no small pieces of meat left over the night. Disinfection shall be done after cleaning.

B.1.13 Water and ice contact with carcass, meat, as well as worker or equipment shall be clean water and meet the standard issued by the Ministry of Public Health.

B.2 PERSONAL HYGIENE

B.2.1 Worker shall have annual health check.
B.2.2 Person known to the fact that is sick, suspected sick or suspected carrier of foodborne contagious diseases shall not be allowed in the production area. Such disease and clinical signs are as follows:

1. Jaundice or tuberculosis
2. Diarrhea, vomit or fever
3. Skin infection
4. Eye, ear throat or nose infection

B.2.3 Person who has wound or injury that is given permission to work should have wound covered by waterproof gauze or plaster.

B.2.4 Nail shall be cut as short as possible and washing hand with soap and disinfectant every time before getting into the production area and after using restroom.

B.2.5 During work, worker shall wear protective clothing, apron, cap, and mask including cleaned and disinfected boots.

B.2.6 Personal belongings and food shall not be brought and kept in the production room. They shall be separately kept in the allocated place.

B.2.7 Protective clothing, apron, cap, mask, boots, tools and equipment shall be cleaned after work and kept in the allocated place.

B.2.8 Assigned worker for each room shall regularly stay in such room and they shall not be allowed to move to other rooms to prevent cross contamination between clean and dirty production area unless permission is given.

B.2.9 Smoking, eating or chewing including inappropriate behavior shall be strictly prohibited in order to prevent cross contamination.
APPENDIX C

DIAGRAM FOR THE PROCEDURES OF GOOD MANUFACTURING PRACTICES FOR CATTLE AND BUFFALO ABATTOIR

(Table 1, Item 18, Section 4)

- Transport of live animals
- Receiving of live animals
- Weighting
- Stunning
- Bleeding
- Head removal
- Docking and carpal and tarsal cutting
- Dehiding
- Open peritoneal cavity—white offal removal
- Open pleural cavity—red offal removal
- Half cutting
- Carcass marking
- Carcass weighting
- Chilling
- Cutting
- Packaging
- Transportation

Remarks: After bleeding, evisceration and half cutting, carcass shall be washed with clean water
APPENDIX D

ESSENTIAL EQUIPMENTS AND TOOLS FOR CATTLE AND BUFFALO ABBATIOR

(Section 4)

Essential equipments and tools for cattle and buffalo abattoir are as follows:

1. Stunning machine
2. Equipment for bleeding
3. Equipments for opening pleural and peritoneal cavity
4. Knife
5. Knife sharpener
6. Dehiding equipment
7. Disinfectant equipment
8. Offal container
9. Half cutting equipment
10. Rail and hook for carcass, and products thereof
11. Litter or table
12. Equipment for moving of cattle and buffalo carcass such as litter or railing system
13. Chilling system such as chilling room, refrigerator or ice tank
14. Balance for live cattle and buffalo and for carcass and products thereof
15. Protective clothes, apron, cap, mask and boots
16. Cleaning equipment
17. Recording and marking equipments