



Ministry of Agriculture
Veterinary Public Health Directorate



Operational Guidelines for Domestic
Abattoirs

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Acronyms

ECTAD:	Emergency Centre for Transboundary Animal Diseases
FAO:	Food and Agriculture Organization of the United Nations
%	Percent
°C	Degree Celsius
CCP	Critical Control Point
Cm	Centimeter
E. coli	Escherichia coli
HMS	Hygiene Management System
hrs	Hours
min	Minute
m/s	Meter per second
s/he	She/he
SOP	Standard Operating Procedures
SPS	Sanitary and Phytosanitary
SSOPs	Sanitation Standard Operating Procedures

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Foreword

This technical document entitled “Operational Guidelines for Domestic Abattoirs” is one of the documents in a series of guidelines and Standard Operating Procedures that were developed from 2008 to 2010 by the then Ministry of Agriculture and Rural Development in collaboration with the Ethiopian Sanitary and Phytosanitary and Livestock and Meat Marketing Program.

This Guidelines document is at present reviewed and updated by the Ministry of Agriculture in collaboration with the FAO-ECTAD Ethiopia, Improving Sanitary Capacity and Facilitating Export of Livestock and Livestock Products from Ethiopia Project. The main goal of the project is to increase exports of meat and livestock to benefit Ethiopian livestock producers and exporters and to promote national economic development.

This document is intended to be used as a reference guide by meat inspectors to regulate the day to day operations of the domestic abattoirs. This document is also intended to assist domestic abattoir operators on the management and operation of a domestic abattoir that produces meat and meat products fit for human consumption.

This document has given consideration to the infrastructural, logistic, human resource and material supply variabilities that exist between the different categories of the domestic abattoirs. Every effort is made to ensure the guidelines outlined here reflect the available facilities and resources in each category of abattoirs without compromising the safety and quality of the meat and meat products to be produced there.

At this point, the Veterinary Public Health Directorate of the Ministry of Agriculture would like to thank the FAO-ECTAD Ethiopia, Improving Sanitary Capacity and Facilitating Export of Livestock and Livestock Products from Ethiopia Project, for providing the necessary technical and financial support required for reviewing, updating and publishing the guidelines.

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Part I: General

1. Introduction

Meat is an important commodity of human diet which needs careful handling throughout the whole production and processing chains. In the process of safe and wholesome meat production, the role-played by the meat handlers in the abattoir and the meat inspection staff in maintaining the health, sanitary and quality standards of the product, through rigorous supervision and control throughout the whole operation of abattoir is very crucial.

The slaughter facilities supplying meat for the domestic market are categorized in four different categories depending on the material and infrastructural facilities they have and their daily slaughter capacities. Regardless of these differences, the aim of the meat inspection service operating in each category of abattoirs is to make sure all meat and meat products produced there meet consumers demand in terms of safety, quality and wholesomeness.

For this there is a need of adapting the operational procedures to be followed in each category of the domestic abattoirs by considering the available facilities and materials in those abattoirs without compromising the final outcome of producing safe and whole some meat. In this regard, this guidelines document is prepared to serve as a reference guide for supervision and control of operations being conducted in the different categories of the domestic abattoirs throughout the country.

1.1 Objective

The objective of this guidelines document is to outline accepted national hygienic and sanitary operational procedures that the meat inspectors and all meat handlers in domestic abattoirs should follow in ensuring the safety, quality and wholesomeness of meat and meat products produced in the respective categories of domestic slaughter facilities.

1.2 Scope

The guidelines outline basic sanitary, hygienic and safety measures that should be applied in all categories of domestic abattoirs.

2. Definition

Abattoir: Any establishment where specified animals are slaughtered and dressed for human consumption and that is approved, registered and/or listed by the competent authority for such purposes.

Abattoir operator or management: The person(s) in control of the abattoir and is responsible for ensuring the meat hygiene requirements are met.

Inedible: Inspected and judged by an inspector veterinarian or meat inspector under his supervision to be unsuitable for human consumption.

Ante-mortem inspection: Any procedure or test conducted by an inspector veterinarian or meat inspector under his supervision on live animals for the purpose of judgement of safety and suitability and disposition

Carcass: The body of an animal after dressing.

Cleaning: refers to the ongoing process of cleaning which takes place throughout the day and reaches its peak after the slaughter process has ended. This process includes the mechanical and chemical methods by which macroscopic and visible dirt is removed. When an object appears to be clean, it is not necessarily free of harmful micro-organisms.

Competent authority: The official authority charged by the regional government with the control of meat hygiene, including setting and enforcing regulatory meat hygiene requirements.

Condemned: Inspected and judged by an inspector veterinarian or meat inspector under his supervision as being unsafe or unsuitable for human consumption and requiring appropriate disposal.

Contaminant: Any biological or chemical agent, foreign matter, or other substance not intentionally added to meat that may compromise meat safety or suitability.

Dressing: The progressive separation of the body of an animal into a carcass and other edible and inedible parts.

Disinfection: The process or act of destroying pathogenic microorganisms.

Dripping: refers to removal of excess water from carcass following carcass washing.

Evisceration: is the removal of viscera, (internal organs, especially those in the abdominal cavity).

Hygiene: refers to a condition that includes the concepts of “clean” and “safe” (in other words the absence of harmful organisms or substances).

Inspector veterinarian: An official inspector who is professionally qualified as a veterinarian and carries out official meat hygiene activities as specified by the regional competent Authority.

Meat inspector: An official inspector who is professionally qualified as a mid- level carrier professional and certified to work under the supervision of the veterinary inspector on meat hygiene activities as specified by the regional competent authority.

Organoleptic inspection: using the senses of sight, touch, taste and smell for identification of diseases and defects.

Offal: The term offal refers to the organ meats of animals: Heart, liver, tongue, kidney, sweetbreads etc.

Red offal: means the lungs, heart, liver, diaphragm, spleen, tongue and demasked head of the slaughtered animal;

Rough offal: means the stomach, intestines, feet

Protective clothing: means special garments intended to prevent the contamination of meat and used as outer wear by persons in an abattoir or establishment, and includes head coverings and footwear.

Poste-mortem inspection: Any procedure or test conducted by an inspector veterinarian or meat inspector under his supervision, on a carcass and other body parts of slaughtered animal for the purpose of judgement of safety and suitability and disposition.

Potable water: means water that is pure and wholesome at the point of usage in accordance with requirements contained in the Ethiopian standard for drinking-water quality.

Sanitation: refers to all processes and principles which are applied to ensure that micro-organism count is kept at a safer or lower level.

Stunning: is the process of rendering animals immobile or unconscious prior to their being slaughtered for food.

Trimming: refers to cutting and taking off contaminated part of a carcass to effectively remove physical debris and bacteria associated with it.

Part II: Operational procedures for grade A and B abattoirs

1. Abattoir organization

The meat inspector should ensure that:

- ❖ The abattoir is registered by the regional regulatory authority and approved to slaughter animals to sale for human consumption.
- ❖ The meat production process moves in one direction without any cross flow which may adversely affect the hygiene of the meat product.
- ❖ The “Dirty” and “Clean” areas of the abattoir are clearly separated by distance and physical barriers

1.1 Dirty areas

- ❖ Offloading platforms and livestock entrance
- ❖ Lairage where animals are kept until they are slaughtered.
- ❖ Ante-mortem inspection area
- ❖ Isolation lairage for animals that are or might be sick.
- ❖ Emergency slaughter facilities for injured animals.
- ❖ Stunning and bleeding area
- ❖ Facilities where condemned and inedible products are handled.
- ❖ Room for the cleaning of rough offal.
- ❖ Toilets, showers, washing facilities

1.2 Clean areas

- Slaughter hall for the dressing of animals with facilities for separating the different components.
- Area for inspection of the carcass and other edible portions.
- Loading bay for meat trucks.
- Office facilities for meat inspectors and for management.
- Laundry facilities

2. Sanitary control

Sanitation is the control of environmental influences which may adversely affect the appearance, flavor, shelf life, safety and aesthetic acceptability of meat and meat products. Meat inspectors have the legal and professional responsibility to assure that meat is produced, handled and transported in a hygienic and sanitary manner. For this,

the meat inspector should actively monitor and supervise applications of the following guidelines.

2.1 General sanitation

- ❖ The abattoir management should have a written and acceptable cleaning and sanitation program for the entire premises and should conduct daily monitoring and supervision of the abattoir sanitation programs
- ❖ Meat inspectors should conduct daily monitoring on implementation of sanitary operations and, when required, take corrective actions.
- ❖ The regional meat inspection service should provide training on personal hygiene and sanitary procedures for employees working in the abattoir
- ❖ All equipment should be cleaned and sanitized before starting the slaughter and dressing operations.
- ❖ Abattoir employees should implement hygiene practices and sanitary working habits
- ❖ In the event of detecting sanitation problems, the meat inspector should stop the slaughter and dressing operations and order the abattoir management and abattoir employees to take appropriate corrective actions

2.2 Specific sanitary measures

2.2.1 Employee training and health status

The meat inspectors should ensure that:

- ❖ Persons who come in contact with meat in the course of their work should have a medical examination prior to their employment and regular checkup at other times when necessary.
- ❖ All meat handlers are given appropriate training in personal hygiene and hygienic handling of meat.
- ❖ No person is permitted to work in any meat handling area while known or suspected to be suffering from a disease likely to be transmitted through meat such as typhoid, dysentery, salmonella and cholera or while afflicted with infected wounds, skin infections, sores or with diarrhea.
- ❖ Any person who has a cut or wound should not be allowed to handle meat or meat contact surfaces until the injury is completely protected by a water proof covering which is firmly secured.

2.2.2 Sanitary work habits

All meat handlers and abattoir employees should be made aware of and comply with the following guidelines:

- ❖ Use of chewing gum, snuff and tobacco in the meat handling areas is prohibited.
- ❖ Eating and drinking should be confined to the designated dining areas.
- ❖ Scratching of the head, face, placing of fingers in or around mouth or nose, coughing, sneezing and spitting should be avoided. If in case, unavoidably happens, hands should be cleaned after each episode.
- ❖ Hand wash facilities should be used by everyone upon entering the meat production area.
- ❖ Hands should always be washed and disinfected immediately, with 100ppm chlorine or liquid soap under running water, before commencing work after using the toilet or handling any material, which might be capable of transmitting disease.
- ❖ Every person, while on duty on the slaughtering or meat handling area, should wash his hands thoroughly as soon as his hands come in contact with blood or any other dirt.
- ❖ One should avoid the use of nail polish, hand creams and lotions when handling meat.
- ❖ Fingernails should not be excessively long and should be kept clean.
- ❖ Cosmetics and strong perfumes should not be allowed
- ❖ Employees should be neatly and cleanly dressed, wear head coverings that properly cover their hair
- ❖ Facial adornments that cannot be removed should be adequately covered when worn in meat handling areas.
- ❖ Persons handling materials capable of contaminating the meat product should discard all protective clothing worn by them and have changed in to clean protective clothing.

2.2.3 Working apparel

The meat inspectors should ensure that the abattoir management enforces compliance of the following clothing guidelines:

- ❖ Any person entering a meat handling area should wear protective clothing covering at least the head, shoes and a coat that covers up to the knee.

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- ❖ All personnel engaged in handling unprotected meat should wear a clean waterproof covering that covers at least the worker's body to the full extent of the potential meat contact zone
- ❖ All personnel who are required to handle unprotected meat should wear footwear that can be effectively cleaned before entering any meat handling area.
- ❖ Staff who may lift beef quarters or sheep and goat carcasses should wear clean and water proof protective neck shields, or hooded overalls.
- ❖ Protective clothing should preferably be light colored so that contamination is easily seen but livestock handlers should wear suitably dark clothing to prevent animals from being distracted.
- ❖ Protective clothing should be provided in such a number as to be sufficient for the abattoir employees and meat inspectors for changing every day and some more spare protective clothing that are to be used for visitors.
- ❖ The boots to be used in the dressing and other meat handling areas of the abattoir should be of a material impervious to moisture and should be of a color distinct from other footwear and these boots should be worn only at the workrooms.
- ❖ Other footwear should be utilized when walking to and from the workstation.
- ❖ Gloves may be worn by all personnel engaged in handling unprotected meat products.
- ❖ Gloves should be cleaned before use and whenever they become visibly contaminated.
- ❖ Hands should be cleaned before gloves are donned and after gloves are removed.
- ❖ Work clothing should not be worn in areas such as washrooms and lunchrooms, outside the abattoir etc.
- ❖ Work clothing should not be kept in lockers used for street clothing,
- ❖ Jewelry items, which cannot be removed such as continuous loop earrings, wedding bands, bracelets or necklaces, etc. should be adequately covered.
- ❖ Items such as pens, pencils, thermometer etc., should not be kept in coat/shirt pockets where they may accidentally fall into products.
- ❖ Meat handlers should change their protective clothing if it becomes excessively soiled
- ❖ Those types of protective clothing such as aprons and foot wears should be washed by hand held sprays as soon as contaminated by blood or gut contents.

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- ❖ Each set of protective clothing should be washed and ironed at the end of the day's operation.
- ❖ If any hand tools and equipment such as knives are found contaminated with blood, gut content or any dirt matter during slaughtering, flaying and other subsequent operations, they should be sanitized (washed in a sanitizing solution such as a 200 ppm chlorine solution or in hot water of 82°c for two minutes and rinse them in water) before proceeding to the next activity.
- ❖ Hand tools such as knives used to slaughter or dress one animal or a carcass should be washed before re-using it for slaughtering any other animal or dressing a carcass.
- ❖ At the end of operations, work clothing and equipment such as knives, hooks, steels, etc should be cleaned and sanitized and be available for the next pre-operational inspection.

2.2.4 Visitors, vehicles and animals

- ❖ Unauthorized personnel and vehicles, non-slaughter animals such as dogs and cats, wild birds and vermin should be kept out of the abattoir compound.
- ❖ Authorized visitors should be supplied with protective clothing before letting them have access to the abattoir premises.

2.2.5 Building Maintenance

When maintenance of the abattoir is required, the abattoir management should make consultation with the inspector for its adequacy and approval of the type of maintenance materials to be used.

2.3 Cleaning program

The inspector and inspector veterinarian should enable the abattoir management to have a written cleaning program for the entire premises indicating areas to be cleaned, method of cleaning to achieve the required efficiency, personnel responsible and frequency of activity. The abattoir management should own the responsibility of implementing and monitoring the activities.

For the slaughter operations to begin, the meat inspector should carry out a pre-operational inspection for effectiveness of the cleaning program to ensure that sanitation requirements have been met:

- Cleaning operations should include areas such as lairages, stunning & bleeding chambers, slaughter hall, offal and hide rooms, toilets, service areas, and all types of equipment.
- Water used for cleaning, hand washing and carcass spraying should be of a potable quality.
- Detergents should have good wetting capacity and rinsing property, be non-corrosive and compatible with other materials including disinfectants used in the sanitation program.

2.3.1 General cleaning procedures

Cleaning procedures should include the following:

- ❖ Loosening and removal of pieces of rubbish, blood, faecal and other contaminants by means of dry sweeping, and removing them by picking them up. Bits of meat and fat and skin, in particular, should not be washed into the drainage system.
- ❖ Wash and scrub with detergents and hot water under pressure.
- ❖ Rinse with clean hot water (45°C) under pressure in order to remove the loosened particles and detergents properly.
- ❖ Disinfect with a suitable disinfectant at the proper concentration (daily or weekly as may be required).

2.3.2 Cleaning during working hours

- ❖ During routine operations, feet, hides and skins, offal, waste scraps, condemned carcass or parts should be removed immediately from the slaughter floor and transferred to their respective designated areas.
- ❖ Garbage found anywhere in the abattoir compound should be collected during and after working hours and disposed of to the designated waste disposal area at least once daily.
- ❖ Obsolete equipment should be removed from production areas.
- ❖ During work break hours cleaning of floors by using cold-water spraying can be done but has to be done with great care to avoid splashing of carcass and offal.
- ❖ Any hand tools such as knives, hooks, saws, etc., which are used for bleeding, ripping, head and feet removal, skinning, carcass dressing, inspection, etc., should be

sanitized by immersing in a tank of water at a temperature of 80-82^oc for two minutes or in a 200 ppm chlorine solution and then rinsed with hot water after being contaminated with dirt matter and/ or using them for one animal or carcass and before reusing them.

- ❖ Those types of protective clothing such as aprons and foot wears should be washed by hand held sprays as soon as contaminated by blood or gut contents
- ❖ Immediately after disposal any container coming in to contact with condemned and inedible products should be cleaned & disinfected in a similar manner.

2.3.3 Cleaning after working hours

- ❖ Dry cleaning (removal of the top and gross dirt particles without using water) should be done immediately after completions of slaughtering operations have ceased. This should embrace the whole premises including the lairages.
- ❖ After dry cleaning is completed detergent solution is applied on the surface of the area (walls, floors, surfaces of stationary equipment, etc.) to be cleaned and the equipment and hand tools are immersed in the hot water detergent solution to loosen soil and bacterial films and holding them in solution or suspension
- ❖ Removal of soil and gross dirt matter by scrubbing from the surface of the walls, floors and equipment and hand tools in the presence of detergent solution
- ❖ Rinsing with hot water should be applied under pressure and 82^oc temperature. Conveyors, chutes and other types of equipment should be cleaned in a similar manner
- ❖ All protective clothing such as aprons, boots, overall, gowns etc. should be cleaned by using a hot detergent water solution and final cold-water rinse, followed by drying and ironing (except for boots and aprons) after the end of the day's operation.

2.3.4 Cleaning and disinfection at weekly intervals

A more through weekly use of detergents and sanitizers is necessary for areas such as the killing floor; detain room, head room, casing and cleaning room, offal preparation room, condemned and inedible room. The commonly used cleaning and disinfection methods include:

- ❖ For small item of equipment such as knives, hooks, saws, trays and others, soaking in a detergent solution in a separate receptacle is necessary to loosen the dirt prior to scrubbing.
- ❖ Removal of soil and gross dirt matter by scrubbing from the surface of the walls, floors and equipment in the presence of detergent solution
- ❖ Application of detergent on the surfaces of areas and stationery equipment in the form of foam, which is allowed to remain for up to 15-20 minutes and then rinsed off with a hot water (80-82^oc) spray.
- ❖ Removable parts of machinery and smaller items of equipment should be submerged in a tank of water at a temperature of 80-82^oc for two minutes.

2.4 Specific cleaning procedures

2.4.1. Lairage

- ❖ At the end of each day's operation, gross debris, dirt and faecal matter should be removed and followed by washing down of floors, walls and partitions using high pressure cold-water spray.
- ❖ At monthly interval partitions, walls or tubular fittings will require scrubbing with a stiff brush or scraper.

2.4.2 Slaughter hall and accessory departments

- ❖ In areas in which carcasses and meat are handled, cold water at low pressure should be used constantly during working hours to remove dirt from the floor and some fixed equipment and to clean operators boots and aprons when contaminated while at work.
- ❖ Cleaning using high-pressure hot water (82^oc) should be used at the end of the day's operation.
- ❖ All mobile equipment and equipment which can be dismantled should be moved to cleaning and sterilization room for cleaning together with other smaller hand tools such as knives, hooks, cleavers (saws), trays and others after the end of the day's operation by immersing in batches in tanks containing hot detergent solution for two minutes and final washing by hot water (82^oc) rinses.

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- ❖ All equipment, which has come in contact with contaminated material or condemned product, should be washed by immersing in sanitizing chlorine water solution of 200 ppm or hot water detergent solution of 82°C for two minutes and final hot water rinse before reuse.
- ❖ All hand tools (equipment) such as knives etc. which are used to bleed, skin, dress, inspect etc. one animal or carcass should be washed clean and sanitized by immersing in a sanitizing chlorine water solution of 200 ppm or hot water detergent solution of 82°C for two minutes and then rinsed with hot water before reusing them for the next animal or carcass.
- ❖ Those types of protective clothing such as aprons and foot wears should be washed by hand held sprays as soon as contaminated by blood or gut contents
- ❖ All protective clothing such as aprons, boots, overall, gowns etc. should be cleaned by using a hot detergent water solution and final cold-water rinse, followed by drying and ironing (except for boots and aprons) after the end of the day's operation.

2.4.3 Changing rooms and toilets

Changing rooms and toilets should be kept clean at all times and a routine cleaning and disinfection procedure should be conducted during work hours and after the day's operation is finalized.

2.4.4 Condemned and inedible product room

Sanitary conditions should be maintained at all times in the condemned and inedible rooms by applying daily cleanup activities as follows:

- ❖ Remove gross debris
- ❖ Apply detergent solution on the surface of the area to be cleaned and submerge the equipment and hand tools in the water detergent solution
- ❖ Remove soil and gross dirt matter by scrubbing from the surface of the walls, floors and equipment and hand tools in the presence of detergent solution.
- ❖ Sterilize equipment after the completion of the day's operation by immersing in batches in tanks containing hot detergent solution or 200 ppm chlorine solution for

two minutes and final washing by hot water (82°C) rinses and the rooms with hot water sprays (82°C).

2.4.5 Abattoir campus

- ❖ Roadways and yards in the immediate vicinity of the slaughter hall and serving premises such as lunchrooms should always be kept clean and free from any objectionable odor.
- ❖ Any garbage material should be immediately collected and disposed of to the designated waste disposal area at least daily.
- ❖ The manure should be collected and bayed near the lairage every day on the dirty side of the compound and transported out of the abattoir at least once a week.

2.4.6 Meat transport vehicles

Meat transport vehicles should be washed clean as soon as they enter to the gate of the abattoir by using high-pressure hot water detergent solution spray and rinsed by hot water.

2.4.7 Drying after cleaning

- ❖ Equipment should be left dry as soon as possible after cleaning by air-drying.
- ❖ Cloths should not be used for drying, as these only spreads contamination.
- ❖ Adequate drainage points should be provided in equipment that cannot be dismantled and drying racks provided for small pieces.

2.5 Equipment and clothing storage

- ❖ All knives, scabbards, steels, hooks, and other tools used by employees, as well as their work clothing such as aprons should be maintained and stored on rust-resistant racks or multiple scabbards, and not in clothes lockers.
- ❖ If locker storage for personal tools of employees is used, the facilities should be separate from those used for clothing

2.6 Equipment

Inspectors and inspector veterinarians should ensure the following guidelines are considered in purchase of abattoir equipment to be used for the production of meat:

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- ❖ Meat contact surfaces of equipment should be constructed with materials that are, smooth; non-corrosive; rust-resistant; non-toxic; non-absorbent; and durable enough to withstand repeated cycles of cleaning and sanitizing.
- ❖ Materials that are not acceptable for equipment that has contact with edible meat products include copper; cadmium; lead; corroded metals; equipment with painted surfaces; containers or equipment made of enamel ware or porcelain used for handling and processing meat products; and wood, plasterboard, or porous acoustic-type boards on any exposed surface that is not appropriately sealed.
- ❖ Equipment made of stainless steel and easy to clean are recommended.
- ❖ The use of wood in meat production and handling areas is prohibited
- ❖ Cloths should not be used for drying, as these only spreads contamination.
- ❖ Aluminum may pit and corrode when exposed to certain chemicals. When friction occurs between aluminum and meat or fat, a black oxide is produced which discolors the meat. The use of aluminum is therefore should be limited to applications where the metal does not directly contact with meat.
- ❖ Portable equipment used for the collection, holding and transfer of condemned and other inedible material should be of rust-resistant metal and be watertight. They should be distinctly and uniformly marked for easy identification.
- ❖ Painted racks are not suitable for use in a high moisture areas.

2.7. Vermin (pest) control

2.7.1 Insects

- ❖ Excellent housekeeping program, along with the use of screens, air curtains, and electrical insect control devices and elimination of all places where the insects can breed and hide are the first steps in avoiding the introduction of insects and rodents.
- ❖ Insecticides should only be used if other precautionary measures cannot be effectively used.
- ❖ The insecticides that are applied should be restricted only to those listed by the federal or regional regulatory authorities.

- ❖ Each insecticide should be specifically formulated for designated use and places with the full awareness of the inspection staff for any potential restrictions for their use or application.
- ❖ Before insecticides application, care should be taken to safeguard all meat, equipment and utensils from contamination.
- ❖ After application, contaminated equipment and utensils with insecticides should be thoroughly cleaned prior to using them again.

2.7.2 Rodents

Rodent control is facilitated by the elimination of rodent harborages in surrounding areas as well as in the abattoir through the elimination of food supply for rodents or, the destruction of rodents. Rodent destruction can be performed either by the use of traps or by use of poisons. Traps can be used in areas where the use of rodenticides may be hazardous and where there is light infestation. They should be checked at least every 24 hours.

In using rodenticides, the following guidelines should be followed:

- ❖ The places where the rodenticides are placed should be identified and adequately supervised by the inspection staff.
- ❖ All bait stations should have a cover and should be removed from edible product rooms and areas before the commencement of daily operations.
- ❖ Only designated abattoir employees who have a thorough understanding of the potential hazards to health resulting from the use of these agents, under adequate inspection control, should prepare and use such materials.
- ❖ The rodenticides that are applied should be restricted only to those listed by the federal or regional regulatory authorities.

2.8 Disposal of waste products

Storage of manure, paunch and viscera contents in the vicinity of the abattoir is not acceptable. They should be removed from the slaughter hall as soon as they are recovered and transported to designated waste disposal areas without creating any objectionable odor and serving as a breeding place for insects.

3. Pre-slaughter operations

3.1 Stock reception and handling

Meat inspectors should make sure that the following procedures are followed:

- ❖ Conduct livestock reception in the presence of competent abattoir livestock handler who is capable of receiving and keep appropriate records.
- ❖ When animals come on truck, make sure they are unloaded as soon as possible after arrival quietly.
- ❖ The condition and state of health of the animals in a lairage should be inspected at least every morning and evening by meat inspector or veterinarian.
- ❖ Animals which are sick, weak, injured or showing visible signs of distress should be separated, and veterinary advice should be sought immediately regarding treatment or the animals should be humanely killed immediately if necessary.
- ❖ As far as possible, established groups of animals should be kept together and each animal should have enough space to stand up, lie down and turn around.
- ❖ Mixing of different species of animals should be avoided, as this will cause disturbance among them.
- ❖ Aggressive horned animals and females on estrous should be penned separately.
- ❖ Fractious animals should not be penned with other animals.
- ❖ Where ties are used, they should allow animals to stand up and lie down without causing injury or distress.
- ❖ Animals should be kept securely in the lairage, and care should be taken to prevent them from escaping and from predators.
- ❖ Potable drinking water should always be provided to all animals, including those kept in the isolation or suspect pen.
- ❖ Feed should be provided to slaughter animals if they are to be kept for more than 12 hours before slaughter. But for those animals to be slaughtered using Halal (Muslim) slaughter methods, feed can be provided all the time while animals are in lairages.
- ❖ Provide a period of 12-72 hours rest for slaughter animals in the lairage before slaughter

- ❖ The lairage area should be well lit in order to enable the animals to see clearly.

3.2 Ante mortem inspection

Ante-mortem inspection consists of examining the live animals, separating those which appear abnormal or diseased and, passing the rest for slaughter. The specific procedures outlined in the “Meat Inspection Guidelines for Domestic Abattoirs” should be followed.

The meat inspectors should follow the following guidelines:

- ❖ Inspect the animals on arrival at the abattoir before and while unloading.
- ❖ Verify that the animals do not have dirty hide, skin or fleece conditions which cause risk of contamination of the meat.
- ❖ Verify that the animals are healthy and are in a satisfactory state as regards to welfare.
- ❖ If an animal is kept for more than 24 hours after its post-arrival ante-mortem inspection, the ante-mortem inspection should be repeated so that it takes place within 24 hours of slaughter.
- ❖ Only animals that are judged to be sufficiently rested should proceed to slaughter and should not be withheld from slaughter any longer than necessary.
- ❖ Ante-mortem inspection should be carried out where the animals can be observed both collectively and individually at rest and motion.
- ❖ While inspecting at rest the inspector should position her/himself at various locations outside the pen and observe all animals and note their general behavior while they are at rest. The inspector should determine if any of the animals show abnormal behavioral patterns such as excessive excitability or severe depression and also should look at the heads, necks, sides, rumps, and legs of as many animals and make a note of any abnormalities.
- ❖ While inspecting in motion the inspector should take the following precautions:
 - Should position her/himself outside the pen next to the open gate to easily view the animals as they are driven and direct the abattoir employee to move all animals slowly and individually back and forth, while she/he observes each animal for abnormalities by viewing the head, neck, shoulder, flank, legs, and rump.

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- The inspector should not make in-motion inspection immediately behind a loose, swinging gate and should not position her/himself in a corner or in a place that allows no escape to safety should an animal turns aggressive.
- The inspector should not climb on high, unstable fences to view the animals during ante-mortem inspection and use safety helmet if required.

- ❖ Animals showing clinical signs of disease should be held for veterinary examination and judgement. They are treated as “suspects” and should be segregated from the healthy animals.
- ❖ Dead and condemned animals should be destroyed during ante-mortem inspection should not be allowed to go to the clean area of the abattoir.
- ❖ Results of ante-mortem inspection should be made available to the person undertaking post-mortem inspection before carcasses are examined at the postmortem inspection point

3.3 Pre-operational checks

Slaughter should not commence before all areas, rooms and equipment have been cleaned and disinfected. In order to check up on the effectiveness of the cleaning and disinfection processes a pre-slaughter inspection of the abattoir should be conducted and appropriate measures taken if problems detected.

3.4 Moving livestock to the slaughter hall

The inspector veterinarian should ensure the slaughter animals movement to slaughter hall follow the following guidelines:

- ❖ Only those animals certified by the meat inspector as fit for slaughter are to be moved to the slaughter hall
- ❖ Moving of animals to the slaughter hall should be carried out with the minimum of excitement of the animals.
- ❖ Animals with extremely wide horns or pronounced lameness should not be introduced in to the lead-up race unless they are able to move freely along the race.
- ❖ Animals dislike going from light to dark and will avoid shadows so that gaps under doors should be avoided.

- ❖ Sticks, metal pipes, or pointed objects should not be used for moving livestock. Canvas or leather flappers, soft polythene pipes and rattles are recommended.
- ❖ Gates should not be used for forcing an animal along races.

3.5 Stunning

The meat inspector should ensure that animals be stunned in compliance with the following procedures:

- ❖ No animal should be stunned, slaughtered or dressed in an abattoir unless the meat inspector is present.
- ❖ Stunning should be carried out in a manner that animals do not regain consciousness while being slaughtered,
- ❖ The equipment used for stunning should be maintained and operated properly in accordance with the manufacturer's recommendations and should be applied correctly.
- ❖ Backup stunning devices should be available for immediate use if the primary method of stunning fails.
- ❖ There should be no more than one animal in stunning box at each time and animals are not left in stunning box during breaks.
- ❖ At the time of stunning, animals should be adequately restrained
- ❖ The head of each animal confined in a stunning box should be securely fastened to enable the animal be stunned with little pain
- ❖ The stunning operation should be carried out by a trained person.
- ❖ Each animal should be stunned and subsequently bled before each operator moves to the next animal.
- ❖ If the animal regains consciousness it should be re-stunned before being slaughtered.

The following methods can be used for stunning animals:

- ❖ To stun adult cattle — firearms or captive bolt can be used. The frontal position should be employed. This is the intersection of imaginary lines connecting the outer canthus of each eye with the opposite ear. People who use a captive bolt pistol for stunning cattle should know where to stand. The operator should never stand in front of the animal, as it will jerk its head away when the pistol is aimed. The best position for the operator is just behind the animal's head. When it looks up, the pistol can be

quickly brought into position and fired. A light above the stunning box encourages the animals to look up.

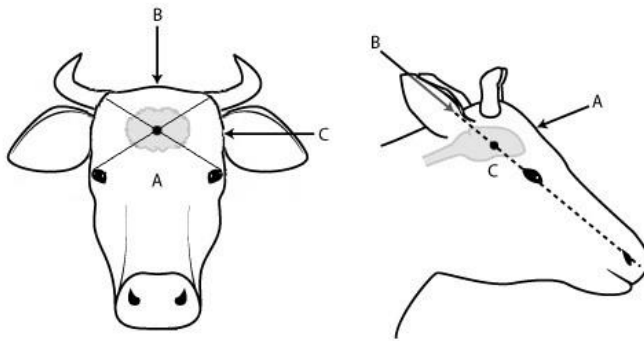


Fig. 1: Stunning points for horned cattle of the captive bolt method

- ❖ For goats and sheep over six months old —slaughtering can be used without stunning.
- ❖ To stun camels over six months old — firearm or captive bolt can be used in stunning camels by the poll or frontal methods as indicated below. Trained camels should be sat down before stunning. For mature bull camels and especially bulls in rut, the captive bolt, if used, should only be applied to the poll position as bulls in rut develop thick glands at the top of the head that prevent the effective use of the captive bolt by the frontal method.

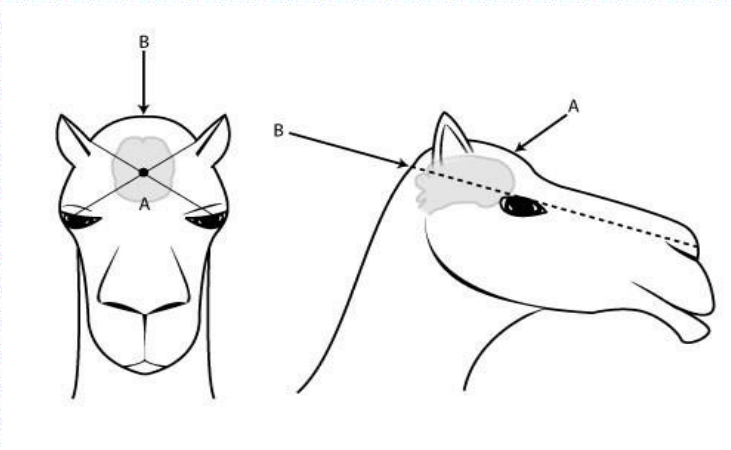


Fig 2. Camel stunning points (poll and frontal methods) of the captive bolt method

4. Slaughter and dressing operations

Guidelines that should be followed in the slaughter and dressing operations should include the following:

4.1 General dressing requirements

- ❖ No dressing procedure shall begin if there is any potential return of a stunned animal to signs consciousness.
- ❖ Carcasses should be dressed after being suspended by the hind legs.
- ❖ The identity of the carcass and all its parts should be maintained throughout the dressing process and until the post mortem inspection is completed.
- ❖ Any contaminated area on the carcass or its parts should be trimmed out. Washing is not sufficient for the removal of visible contamination.
- ❖ No person removes offal or viscera from the viscera table until it has been inspected and given permission by the inspector.
- ❖ Carcasses should be spaced so that un-skinned carcasses do not come into contact with any other carcass, carcass parts, floors, walls or other structures.
- ❖ Under no circumstance, skinning, evisceration and other preparation of animals condemned on ante-mortem inspection, or found dead, is done on the killing floor but should be carried out in a special area reserved for that purpose.

4.2 Slaughter

- ❖ All animals should either be instantaneously slaughtered or stunned by means of instruments capable of instantaneously rendering the animal insensible to pain until death supervenes.
- ❖ The slaughtering operation should be carried out by trained personnel and should apply correct shackling and hoisting procedures.
- ❖ In stunned animals, they should be promptly shackled, hoisted and conveyed to a properly constructed bleeding area, and then bled or slaughtered.
- ❖ An animal should be bled within 60 seconds after stunning
- ❖ In animals slaughtered without stunning, slaughtering should be done on a bleeding table instantaneously and the carcass is then shackled and hoisted.
- ❖ The slaughter method involves cutting the throat and bleeding to death.

- ❖ Cutting both carotid arteries and jugular veins results in brain failure with consequent unconsciousness, but when only one carotid artery is cut brain failure will not occur within approximately seventy seconds. If the carotids are missed altogether and only the jugulars are cut the animal can take as long as five minutes to die. Therefore, the aim should be to ensure that both carotid arteries and jugular veins are cut and separated as expeditiously and physically as possible.
- ❖ No animal should be slaughtered in the sight of any other animal awaiting slaughter.
- ❖ Sufficient space and time should be made available for bleeding so that blood will be confined to the bleeding area.
- ❖ knives should not be wiped “clean” on hides, pelts or cloths, they should not be laid on floor, hand washbasins or platforms but instead knives should be frequently washed and sterilized.
- ❖ The slaughtering knives should be adequately rinsed and sanitized between each animal. Heat causes blood to coagulate, so the knife should be rinsed with cold water before it is placed in the sterilizer.
- ❖ Blood intended for edible purposes should be collected without contamination
- ❖ Heads and feet should not be removed while the animal is still bleeding.
- ❖ After the animal is being slaughtered, bleeding should normally continue for at least 6-8 minutes for cattle and 3-4 minutes for sheep. If shorter periods are allowed, blood will drip on the dressing floor, causing contamination in this work area.
- ❖ Blood should not be allowed to enter to the drainage system but should be collected in a bleeding trough.
- ❖ Immediately after slaughter and before head is removed, numbered tags should be placed on each head and carcass of the slaughtered animal.
- ❖ No person commences to dress a slaughtered animal until the flow of blood has ceased and life is extinct.

4.3 Ripping

- ❖ The removal of the hide or skin begins by making cutting (ripping) lines by using a sharp tipped and straight bladed knife.
- ❖ The skin should be cut from inside out to prevent carcass contamination with hair and dirt.

- ❖ Knives should be rinsed clean after ripping and before proceeding to the next operations.

4.4 Hide and skin removal

The following guidelines should be followed:

- Skinning should begin at the hind shanks and proceed downward, in such a way that its outer surface rolls away from the carcass.
- Except for the original incisions for sticking and starting the skinning operations at the poll and shanks, incision into the skin should be made with the knife blade directed toward the hair side of the skin to prevent contaminating the flesh with cut hair.
- Carcasses should be kept sufficiently far apart from each other to prevent contamination from skinned parts of adjacent carcasses.
- To avoid shank contamination, the lower skinning should not begin until the carcass has passed the points of common contact, such as hindquarter skinning platforms and, the fore shanks is left on until the brisket and fore shanks are partially skinned.
- When using mechanical hide or skin pullers, tremendous energy exerted during the final removal of the hide is not generating aerosols and air flow; any aerosols created at this stage should be directed away from the carcasses being skinned to prevent contamination of the carcasses.

4.5 Feet removal

- ❖ Feet removal starts by skinning the area above and below the carpal and tarsal joints and making circular incisions around these joints
- ❖ The front and hind feet should be removed before any other incision is made in to the carcass.
- ❖ In removing the front feet, care should be taken to expose the tissues of the fore shank as little as possible and leave a "tie" of the hide completely covering the shank as far down as possible toward the carpal articulation where the cut is made to remove the foot.
- ❖ Feet should be removed without contacting the hide or skin, and be placed in a container before taking them to the inedible room.

4.6 Pizzle or udder removal

- ❖ Penis, prepuce and lactating udders should be carefully removed without contaminating the carcass.
- ❖ Mammary lymph nodes should remain on the carcass until the inspection is completed.
- ❖ Unless retained for inspection, udders should be sent to the condemned and inedible offal room.

4.7 Bung (rectum) dropping

- ❖ A circular cut should be made around the anus and vulva taking care to leave the anal sphincter intact.
- ❖ Anus and rectum should be freed from the surrounding tissue with a clean knife.
- ❖ Bung (rectum) should be pulled out using a hook or other device, and tie it firmly, along with the neck of the urinary bladder, and then drop into the pelvic cavity so that fecal matter or urine may not escape and contaminating the carcass.
- ❖ Any small pieces of skin left on the anal region should be removed before returning to the pelvic cavity.

4.8 Head removal

- ❖ The heads should be removed from the carcass in such a manner to avoid soiling them with rumen contents (this can usually be accomplished by tying the esophagus and then pulling the head sharply to the side as the gullet is cut).
- ❖ There should be no contamination of heads or other skinned areas of the neck by coming in contact with other heads and carcasses, the floor, or fixed objects.
- ❖ Removed heads should be taken to the headroom and hanged by their mandible.
- ❖ The employee who removes heads should wash his hands and sanitize his knives after each head removal.
- ❖ Prior to washing, the horns, all pieces of hide, and eardrums should be removed from each head and the equipment used for holding heads for trimming and dehorning is cleaned between each head.

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- ❖ The washing of heads should be done in compartments or areas that will control the splash of wastewater to prevent contamination of other heads or adjacent carcasses.
- ❖ The oral and both nasal cavities should be thoroughly flushed before washing the outer surfaces of each head.

4.9 Esophagus rodding and tying

The esophagus of slaughtered animals is removed through the diaphragm and thoracic cavity without rupture, by separating the esophagus from the trachea, lungs and surrounding tissue by rodding instrument and effectively tied before evisceration.

4.10 Evisceration

- ❖ Any contaminated part on the carcass should be trimmed off from the midline before opening the abdominal cavity.
- ❖ A small starting cut should be made on the caudal ventral side of the abdominal muscle and extend the incision downward to the chest area as much as sufficient space is available.
- ❖ The incision into the pelvic cavity to "ring" the bung should be made by a person with clean hands and a clean knife.
- ❖ Care should be taken to avoid cutting or breaking the paunch and intestines, and prior to evisceration, the rectum and neck of the bladder are secured to prevent urine and fecal leakage.
- ❖ At the time of evisceration, ties are made at the point where the small intestine leaves the stomach and at the point where the esophagus attaches to the paunch; at each of these two named points, two ties are made about 10 centimeters apart with the contents being stripped from the intervening portion of the intestine or esophagus, respectively, before the second tie is made so that the tissues can be severed between the ties without any spillage of contents.
- ❖ The removed viscera should be placed on the viscera inspection table.
- ❖ The thoracic viscera should be removed after the removal of the abdominal viscera is completed and placed in the viscera table.

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- ❖ The uro-genital organs such as bladder, ovaries and uterus, should be removed in total without incising them, and transfer to inedible room.
- ❖ The eviscerator should not cut into any organ, nor he removes the gall bladder from the liver; and the gall bladder is not emptied on to the floor.
- ❖ After evisceration, the viscera should be identified by a similar number (tag), which was attached to the head and carcass
- ❖ While accidental contamination may occur, contaminated carcasses should be trimmed but not washed.
- ❖ The eviscerator should not flush out carcass cavities
- ❖ Hands should be washed regularly during the evisceration process.
- ❖ If the eviscerating knife is contaminated while evisceration is being done, it should be sanitized before reuse
- ❖ Contaminated footwear, apron, or knives should be thoroughly cleaned and disinfected.
- ❖ The saw or other instrument used to split the brisket should be disinfected after each use.
- ❖ No offal or viscera be removed from the viscera table until inspection is completed.
- ❖ Work-up operations on the viscera table are to be kept to a minimum until after inspection and maintain identification of the viscera with the carcass.
- ❖ Hepatic lymph nodes are to remain attached to the liver for inspection purposes.
- ❖ Kidneys should either be presented for inspection with other edible offal, or left hanging on the carcass by their attachments.

4.11 Carcass splitting

- ❖ Prior to splitting, all contamination, abscesses, bruises, and tissue damaged by grubs should be removed from the midline area of the back in order to prevent spreading of such contaminants to bone and other surfaces by the saw or cleaver.
- ❖ When splitting is done at the half-hoist position, care should be taken to avoid the neck contacting the floor.

- ❖ Disinfection of the carcass splitting equipment should be done after each use.

4.12 Carcass trimming

- ❖ Trimming should be carried out before and after inspection
- ❖ The trimmer should remove hair, blood clots, pieces of hide, flecks of rail and other dust, and minor amounts of faecal material or stain
- ❖ Bruising or pathological lesions should not be trimmed before inspection.

4.13 Postmortem inspection

The head, viscera and carcass of each slaughter animal should be inspected by the inspector based on the guidelines indicated in the Meat Inspection Guidelines for Domestic Abattoirs. The activities include the following:

- ❖ During presentation for inspection, the identity of the head, viscera and carcass should be maintained.
- ❖ No unnecessary and injudicious cuts, excisions and marks are made on carcasses during the meat inspection and care should be taken to avoid any unnecessary soiling, contamination or mutilation.

Based on the decisions of the meat inspector veterinarian, the abattoir employee should transfer the inspected products in to appropriate locations as indicated below:

- ❖ Those parts of carcasses or viscera which are free from diseases or gross contamination and considered safe for human consumption should be transferred to:
 - The whole or part of the carcass to the next stage of carcass wash room.
 - Those parts of viscera (stomach and intestines) to the casing cleaning room
 - The edible offals (such as heart, liver, head together with tongue, etc.) to offal preparation room
 - Inedible offals (such as lungs etc.) should be put in large cans (containers) marked "inedible" and transferred to condemned and inedible room.
- ❖ Those parts of carcass or viscera which may need further check-up by the inspecting veterinarian should be transferred to the product detaining room.

- ❖ Those parts of carcass or viscera, which are not fit for human consumption, should be transferred to the condemned and inedible room.
- ❖ No person removes from an abattoir a carcass, meat, viscera or animal product which has been detained or condemned without the authorization of the inspector veterinarian in charge.

4.14 Carcass washing

- ❖ Carcass re-trimming should be done after inspection if there is still a need of removing any remnants of stick wounds, any residual pieces of hide, blood clots, bruised tissue and contamination before washing.
- ❖ All carcasses should be washed to remove blood and bone dust.
- ❖ Carcass washing should be done from top to down wards with a flow rate of 10 liters per minute for about 30-60 seconds.
- ❖ After washing, carcasses should be allowed to stay in the slaughter floor for about 30 minutes until the water is dripped out of the carcass so that stamping can easily be done.

4.15 Marking and branding

The application of information to carcasses and parts or their containers by a brand or mark is a fast, distinctive, and durable method of identification.

- ❖ All carcasses after being approved at inspection and as soon as the carcass is dry enough to hold the ink, should be legibly branded with the official inspection legend (Inspected and passed).
- ❖ Brands are to be applied by abattoir employee under the direct supervision of the inspector and inspector veterinarian.
- ❖ No person may place a stamp of approval on, or remove such mark from any carcass except under the supervision of the veterinary inspector.
- ❖ All carcasses are to be branded legibly with inspection legend after inspection with four stamps per side (on neck, thoracic, abdominal and hind quarter areas) and one stamp on each of the left and right peritoneum (a total of 10 stamps per carcass).

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- ❖ All stamps or roller marks used to mark any carcass or meat should be constructed of a non-toxic, noncorrosive material and should be so constructed as to be readily cleanable.
- ❖ The stamps should contain the abattoir identification number; and the wording “Inspected and Passed” should be written in the local (regional) and Amharic languages.
- ❖ The use of the Meat Inspection Legend is only permitted in connection with edible meat products slaughtered in a registered and licensed domestic abattoir.
- ❖ The Meat Inspection Legend should be applied to the carcass but not be used on inedible meat products.
- ❖ The stamp of approval should be kept and used under control of the meat inspector;
- ❖ Stamps and roller marking equipment should be kept hygienically, away from the floor and other dirty surfaces and be cleaned and sterilized regularly during use.

4.16 Cold room operations

Meat that is fit for human consumption should be handled and stored in a manner that will protect it from contamination and deterioration. In order to preserve the quality, bloom, and weight of meat, it is highly desirable to begin refrigeration as soon as possible after slaughter.

Although most of the carcasses in domestic abattoirs are distributed within few hours after slaughter, in those domestic abattoirs that may have cold rooms, carcasses, sides or quarters should be moved to rooms with a temperature of 10 °C (3 °C for offals) and the mean air speed at a level above 0.75m/s to be kept for the first 12 hours within one hour after the dressing operations are completed to allow carcass maturation. The maximum storage capacity of the cooler room should not be exceeded and there should be adequate air flow.

4.17 Edible offal room operations

Different carcass parts or offals can be harvested for human consumption in spite of existence of preference variations among different cultural or religious groups. The following guidelines should be followed:

4.17.1 Red offal

- ❖ Red offal should be washed with clean running water, hung on hooks.
- ❖ Red offal should not be stored, or come into contact, with rough offal.

Head

- ❖ Head meat can be harvested for human consumption only after the post mortem inspection is completed and the carcass has been passed.
- ❖ The intact head should be skinned and visibly clean. The nasal and oral cavities should be flushed before the head is presented for inspection.
- ❖ Cheek meat should be trimmed free of the salivary glands and mucous membranes and washed thoroughly.
- ❖ If firearms are used for stunning, the cheek meat cannot be harvested because of the lead fragments that may enter in to the cheek muscles.

Tongue: Tongues should be trimmed to remove any portions of the larynx, epiglottis, or tonsils. The severed base of the tongue should be trimmed if there is any contamination and washed.

Heart: Hearts should be cut open or inverted to permit the complete removal of all blood clots. The aorta and other major blood vessels are to be removed to within 2 cm of their origin from the external surface of the heart to the end of the cut vessels. After washing, hearts should be drained.

Liver: The gall bladder should be removed from the liver but can be harvested separately as edible if there is a need to do so. The inspector should open the hepatic ducts longitudinally and examine them for the presence of liver flukes. Livers with defects such as parasites (e.g. flukes), lump, tumors, abscess should not be harvested for human consumption.

Kidneys: Kidneys from food animals can be harvested as an edible product.

Oesophagus meat: The oesophagus can be harvested by cutting through its musculature distally adjacent to the rumen/stomach without cutting into the mucosal lumen. The oesophagus is then pulled away from the rumen/stomach.

4.17.2 Washing of rough offal

- ❖ Rough offal should be removed from the dressing room to the offal room where paunches and intestines should be separated and emptied of its contents; washed with clean running water; and hung on hooks for drip drying.
- ❖ Equipment should be provided for emptying of rumens and intestines and the ruminal and intestinal content should be removed continuously.
- ❖ Only carcass parts harvested under hygienic conditions, derived from approved carcasses, and free of pathological lesions should be identified as edible meat products.
- ❖ The identity of these parts should be maintained until the corresponding dressed carcass is approved.

4.18 Condemned and inedible room operations

Condemned and inedible products should be handled carefully and disposed of in a sanitary manner following the guidelines indicated below:

- ❖ The condemned materials, which were transferred from the slaughter hall, should stay in the condemned room until they are treated by the veterinarian to make them obviously unfit for human meat (by sight, smell, or taste by adding certain chemicals such as powdered charcoal, kerosen, food grade dyes, etc.)
- ❖ Dead and condemned animals to be destroyed during ant-mortem inspection should not be taken away from the condemned and inedible room until rendered inedible by the veterinarian.
- ❖ When a carcass is condemned an inspector veterinarian should put a "**Condemned**" mark on its outer surface to make identification obvious.
- ❖ Containers used for condemned meat products should be distinctly marked "**Condemned**". They should be preferably of a color that distinguishes them from containers used for edible meat products.

- ❖ Immediately after disposal, any receptacle (container) coming in to contact with the condemned products should be cleaned & disinfected properly.
- ❖ Livestock owners can salvage certain condemned meat products, which may be unfit for human consumption but be safe for pet animals, with the consent of the inspector veterinarian.
- ❖ Denaturing is required to clearly distinguish such pet animal meat products from those prepared and approved for human consumption by adding charcoal or another denaturing agent to the meat product.

4.19 Inedible meat products handling

- ❖ Inedible meat products such as lungs, spleen, uterus, ovaries, udder and others should stay until they are treated by the meat inspector or inspector veterinarian to make them obviously unfit for human consumption (by sight, smell, or taste).
- ❖ Other by-products such as horns and hoofs should be disposed of away from the abattoir's campus.

4.20 Dispatching and meat transport

The meat inspectors should ensure that the meat and meat products are delivered to the customer or retailers in unaltered in manner that will not affect their fitness for human consumption. They have to ensure that the meat and meat products are dispatched directly from the abattoir's dispatch area and transported in the following manner:

- ❖ Meat approved for human consumption should be transported from the abattoir to the retail shops by using dedicated meat transport vehicles
- ❖ Meat should not be placed in any form of transport vehicle that has not been cleaned and sanitized before loading.
- ❖ While on transport, meat should not come in to contact with the floor.
- ❖ Where human labor is required for loading and unloading of carcasses during transportation, personnel should be healthy and neatly dressed with proper protective clothing
- ❖ Carcasses, sides and quarters should be hung during transport.
- ❖ The engine of a carrier shall not be allowed to run whilst loading or un-loading is in process and all doors and lids shall be securely closed before the engine is started.

- ❖ Fueling of carriers shall not take place whilst the doors or the lids of a carrier are open.
- ❖ For transporting of meat for less than two hours duration; the meat may be transported in non-insulated vehicles provided that they are fitted with sub-protection in the form of a double roof, the components of which shall be not less than 4 centimeters apart. Meat transport trucks should be fitted with a roof-top rotating ventilator and air outlets to provide for adequate ventilation.
- ❖ For transporting of meat for less than four hours duration, the meat shall be transported in insulated carriers the insulation being such as to allow only a maximum increase in the meat temperature of 1° C per hour.
- ❖ No person shall be allowed to stay in the compartment where meat is kept during transport.

4.20.1 Meat transport vehicle compliance requirements

- ❖ Meat and carcasses should be transported from the abattoir to the retail shops and supermarkets in sealed and specially designed vehicles.
- ❖ For the transportation of carcass meat, whether in whole carcass sides, quarters or boned cut meat, rails shall be used and constructed as follows:
 - the hooks on the rails shall be of such a construction as to prevent the meat from falling down during transportation;
 - minimum rail spacing for hindquarters and boned cut meat shall be 40 centimeters and for forequarters 35 centimeters;
 - minimum space between rails shall be 60 centimeters;
- ❖ Vehicle design should permit effective inspection, cleaning, disinfection.
- ❖ Vehicles should be designed and built to make locking and sealing easy, protect the meat against extremes of heat and prevent infestation by pests.
- ❖ Vehicle body should be sufficiently insulated and be in good repair with no holes in the body that might allow heat, dust, or other adulterants to enter the vehicle.
- ❖ Vehicle doors and seals should be securely closed.
- ❖ Vehicles used for the transport of meat and edible products should be used exclusively for this purpose and should be clean at the point of loading.

- ❖ Ensure any equipment or surfaces that contact meat products are made of nontoxic, noncorrosive materials that can be effectively cleaned. For example, the surfaces may be made with stainless steel or be coated with food-grade epoxy resins.
- ❖ Vehicle internal surfaces including the floor should be light colored that allows visible contamination to be seen easily, impervious, corrosion resistant, non-toxic and made of a durable material that can be sanitized easily.
- ❖ Vehicle floor to wall and wall to wall junctions should be rounded.
- ❖ Vehicles should have an overhead rail for carcass transport.

4.20.2 Loading of meat

- Workers should wear clean protective clothing.
- Loading surroundings and equipment should be ensured that they are clean from possible contamination.
- Rough offal should not be loaded in the same loading space as carcasses, portions or red offal, unless such rough offal is kept in clean, waterproof containers with tight fitting lids.

Part III: Operational procedures for grade C abattoirs

1. Abattoir organization

The meat inspector should ensure that:

- ❖ The abattoir is registered by the regional regulatory authority and got approval to slaughter animals to sale for human consumption.
- ❖ The meat production process moves in one direction without any cross flow which may adversely affect the hygiene of the meat product.
- ❖ The “Dirty” and “Clean” areas of the abattoir are clearly separated by distance and physical barriers

1.1 Dirty areas

- Livestock entrance
- Lairage
- Stunning and bleeding area
- Facilities where condemned and inedible products are handled.
- Room for the cleaning of rough offal.

- Toilets, showers, washing facilities

1.2 Clean areas

- ❖ Slaughter hall with facilities for separating the different components.
- ❖ Area for inspection of the carcass and other edible portions.
- ❖ Loading bay for meat trucks.
- ❖ Office facilities for meat inspectors and for management.

2. Sanitary control

Sanitation is the control of environmental influences which may adversely affect the appearance, flavor, shelf life, safety and aesthetic acceptability of meat and meat products. Meat inspectors and inspector veterinarians have the legal and professional responsibility to assure that meat is produced, handled and transported in a hygienic and sanitary manner. For this, the inspector veterinarian should actively monitor and supervise applications of the following guidelines.

2.1 General sanitation

- ❖ The abattoir operator should have a written and acceptable cleaning and sanitation program for the entire premises and should conduct daily monitoring and supervision of the abattoir sanitation programs
- ❖ Meat inspectors should conduct daily monitoring and supervision of sanitary operations and, when required, take corrective actions. In the event of detecting sanitation problems, stop the slaughter and dressing operations and order the abattoir management and employees to take appropriate corrective actions.
- ❖ The regional meat inspection service should provide training on personal hygiene and sanitary procedures for employees working in the abattoir
- ❖ Ensure all equipment are cleaned, and sanitized before starting the slaughter and dressing operations.
- ❖ Ensure that abattoir employees implement hygiene practices and sanitary working habits

2.2 Specific sanitary measures

2.2.1 Employee training and health status

The meat inspectors and inspector veterinarians should ensure that:

Operational guidelines for domestic abattoirs

- ❖ Persons who come in contact with meat in the course of their work should have a medical examination prior to their employment and regular check-ups at other times when necessary.
- ❖ All meat handlers are given appropriate training in personal hygiene and hygienic handling of meat.
- ❖ No person is permitted to work in any meat handling area while known or suspected to be suffering from a disease likely to be transmitted through meat such as typhoid, dysentery, cholera or while afflicted with infected wounds, skin infections, sores or with diarrhea.
- ❖ Any person who has a cut or wound should not be allowed to handle meat or meat contact surfaces until the injury is completely protected by a water proof covering which is firmly secured.

2.2.2 Sanitary work habits

All meat handlers and abattoir employees should be made aware of and comply with the following guidelines:

- ❖ Use of chewing gum, snuff and tobacco in in the meat handling areas is prohibited.
- ❖ Scratching of the head, face, placing of fingers in or around mouth or nose, coughing, sneezing and spitting should be avoided. If in case, unavoidably happens, hands should be cleaned after each episode.
- ❖ Hand wash facilities should be used by everyone upon entering the meat production area.
- ❖ Hands should always be washed and disinfected immediately, with 100ppm chlorine or liquid soap under running water, before commencing work after using the toilet or handling any material, which might be capable of transmitting disease.
- ❖ Every person, while on duty on the slaughtering or meat handling area, should wash his hands thoroughly as soon as his hands come in contact with blood or any other dirt.
- ❖ One should avoid the use of nail polish, hand creams and lotions when handling meat.
- ❖ Fingernails should not be excessively long and should be kept clean.
- ❖ Cosmetics and strong perfumes should not be allowed

- ❖ Employees should be neatly and cleanly dressed, wear head coverings that properly cover their hair
- ❖ Facial adornments that cannot be removed should be adequately covered when worn in meat handling areas.
- ❖ Persons handling materials capable of contaminating the meat product should discard all protective clothing worn by them and have changed in to clean protective clothing.

2.2.3 Working apparel

- ❖ Any person entering a meat handling area should wear protective clothing covering at least the head, shoes and a coat that covers up to the knee.
- ❖ All personnel engaged in handling unprotected meat should wear a clean waterproof covering that covers at least the worker's body to the full extent of the potential meat contact zone
- ❖ All personnel who are required to handle unprotected meat should wear footwear that can be effectively cleaned before entering any meat handling area.
- ❖ Staff who may lift beef quarters or sheep and goat carcasses should wear clean and water proof protective neck shields, or hooded overalls.
- ❖ Protective clothing should preferably be light colored so that contamination is easily seen but livestock handlers should wear suitably dark clothing to prevent animals from being distracted.
- ❖ Protective clothing should be provided in such a number as to be sufficient for the abattoir employees and meat inspectors for changing every day and some more spare protective clothing that are to be used for visitors.
- ❖ The boots to be used in the dressing and other meat handling areas of the abattoir should be of a material impervious to moisture and should be of a color distinct from other footwear and these boots should be worn only at the workrooms. Other footwear should be utilized when walking to and from the workstation.
- ❖ Gloves may be worn by all personnel engaged in handling unprotected meat products.
- ❖ Gloves should be cleaned before use and whenever they become visibly contaminated.
- ❖ Hands should be cleaned before gloves are donned and after gloves are removed.

Operational guidelines for domestic abattoirs

- ❖ Work clothing should not be worn in areas such as washrooms and lunchrooms, outside the abattoir etc.
- ❖ Work clothing should not be kept in lockers used for street clothing,
- ❖ Items such as pens, pencils, thermometer etc., should not be kept in coat/shirt pockets where they may accidentally fall into products.
- ❖ Meat handlers should change their protective clothing if it becomes excessively soiled
- ❖ Those types of protective clothing such as aprons and foot wears should be washed by hand held sprays as soon as contaminated by blood or gut contents.
- ❖ Each set of protective clothing should be washed and ironed at the end of the day's operations.
- ❖ If any hand tools and equipment such as knives are found contaminated with blood, gut content or any dirt matter during slaughtering, flaying and other subsequent operations, they should be washed in a sanitizing solution such as a 200 ppm chlorine solution for two minutes and rinse them in water before proceeding to the next activity.
- ❖ Hand tools such as knives used to slaughter or dress one animal or a carcass should be washed before re-using it for slaughtering any other animal or dressing a carcass.
- ❖ At the end of operations, work clothing and equipment such as knives, hooks, etc should be cleaned and sanitized.

2.2.4 Visitors, vehicles and animals

- ❖ Unauthorized personnel and vehicles, non-slaughter animals such as dogs and cats, wild birds and vermin should be kept out of the abattoir compound.
- ❖ Authorized visitors should be supplied with protective clothing before letting them have access to the abattoir premises.

2.3 Cleaning program

The meat inspector should enable the abattoir management to have a written cleaning program for the entire premises indicating areas to be cleaned, method of cleaning to achieve the required efficiency, personnel responsible and frequency of activity.

- ❖ For the slaughter operations to begin, the meat inspector should carry out a pre-operational inspection for effectiveness of the cleaning program.

- ❖ Cleaning operations should include areas such as lairages, stunning & bleeding chambers, slaughter hall, offal and hide rooms, toilets, service areas, and all types of equipment.
- ❖ Water used for cleaning, hand washing and carcass spraying should be of a potable quality.
- ❖ Detergents should have good wetting capacity and rinsing property, be non-corrosive and compatible with other materials including disinfectants used in the sanitation program.

2.3.1 General cleaning procedures

Cleaning procedures should include the following:

- ❖ Loosening and removal of pieces of rubbish, blood, faecal and other contaminants by means of dry sweeping, and removing them by picking them up. Bits of meat and fat and skin, in particular, should not be washed into the drainage system.
- ❖ Wash and scrub with detergents and hot water under pressure.
- ❖ Rinse with water under pressure in order to remove the loosened particles and detergents properly.
- ❖ Disinfect with a suitable disinfectant at the proper concentration.

2.3.2 Cleaning during working hours

- ❖ During routine operations, feet, hides and skins, offal, waste scraps, condemned carcass or parts should be removed immediately from the slaughter floor and transferred to their respective designated areas.
- ❖ Garbage found anywhere in the abattoir compound should be collected during and after working hours and disposed of to the designated waste disposal area at least once daily.
- ❖ During work break hours cleaning of floors by using cold-water spraying can be done but has to be done with great care to avoid splashing of carcass and offal.
- ❖ Any hand tools such as knives, hooks, saws, etc., which are used for bleeding, ripping, head and feet removal, skinning, carcass dressing, inspection, etc., should be sanitized by immersing in a tank of water for two minutes in a 200 ppm chlorine

solution and then rinsed with water after being contaminated with dirt matter and/ or using them for one animal or carcass and before reusing them.

- ❖ Those types of protective clothing such as aprons and foot wears should be washed by hand held sprays as soon as contaminated by blood or gut contents

2.3.3 Cleaning after working hours

- ❖ Dry cleaning (removal of the top and gross dirt particles without using water) should be done immediately after completions of slaughtering operations have ceased. This should embrace the whole premises including the lairages.
- ❖ After dry cleaning is completed, detergent solution is applied on the surface of the area (walls, floors, surfaces of stationary equipment, etc.) to be cleaned and the equipment and hand tools are immersed in the water detergent solution to loosen soil and bacterial films and holding them in solution or suspension
- ❖ Removal of soil and gross dirt matter by scrubbing from the surface of the walls, floors and equipment and hand tools in the presence of detergent solution
- ❖ Rinsing with water should be applied under pressure.
- ❖ All protective clothing such as aprons, boots, overall, gowns etc. should be cleaned by using a detergent water solution and final water rinse, followed by drying and ironing (except for boots and aprons) after the end of the day's operation.

2.3.4 Cleaning and disinfection at weekly intervals

A more through weekly use of detergents and sanitizers is necessary for areas such as the killing floor; detain room, head room, casing and cleaning room, condemned and inedible room. The commonly used cleaning and disinfection methods include:

- ❖ For small item of equipment such as knives, hooks, saws, trays and others, soaking in a detergent solution in a separate receptacle is necessary to loosen the dirt prior to scrubbing.
- ❖ Removal of soil and gross dirt matter by scrubbing from the surface of the walls, floors and equipment in the presence of detergent solution

- ❖ Application of detergent on the surfaces of areas and stationery equipment in the form of foam, which is allowed to remain for up to 15-20 minutes and then rinsed off with water spray.

2.4 Specific cleaning procedures

2.4.1. Lairage

At the end of each day's operation, gross debris, dirt and faecal matter should be removed and followed by washing down of floors, walls and partitions using high pressure cold-water spray.

2.4.2 Slaughter hall and accessory departments

- ❖ In areas in which carcasses and meat are handled, cold water at low pressure should be used constantly during working hours to remove dirt from the floor and to clean operators boots and aprons when contaminated while at work.
- ❖ Cleaning using high-pressure water should be used at the end of the day's operation.
- ❖ All mobile equipment and equipment which can be dismantled should be moved to cleaning and sterilization room for cleaning together with other smaller hand tools such as knives, hooks, cleavers (saws), trays and others after the end of the day's operation by immersing in batches in tanks containing detergent solution for two minutes and final washing by water rinses.
- ❖ All equipment, which has come in contact with contaminated material or condemned product, should be washed by immersing in sanitizing chlorine water solution of 200 ppm for two minutes and final water rinse before reuse.
- ❖ All hand tools (equipment) such as knives etc. which are used to bleed, skin, dress, inspect etc. one animal or carcass should be washed clean and sanitized by immersing in a sanitizing chlorine water solution of 200 ppm or water detergent solution for two minutes and then rinsed with water before reusing them for the next animal or carcass.
- ❖ Those types of protective clothing such as aprons and foot wears should be washed by hand held sprays as soon as contaminated by blood or gut contents

- ❖ All protective clothing such as aprons, boots, overall, gowns etc. should be cleaned by using a detergent water solution and final water rinse, followed by drying and ironing (except for boots and aprons) after the end of the day's operation.

2.4.3 Changing rooms and toilets

Changing rooms and toilets should be kept clean at all times and a routine cleaning and disinfection procedure should be conducted during work hours and after the day's operation is finalized.

2.4.4 Condemned and inedible product room

Sanitary conditions should be maintained at all times in the condemned and inedible rooms by applying daily cleanup activities as follows:

- ❖ Remove gross debris
- ❖ Apply detergent solution on the surface of the area to be cleaned and submerge the equipment and hand tools in the water detergent solution
- ❖ Remove soil and gross dirt matter by scrubbing from the surface of the walls, floors and equipment and hand tools in the presence of detergent solution.
- ❖ Sterilize equipment after the completion of the day's operation by immersing in batches in tanks containing detergent solution or 200 ppm chlorine solution for two minutes and final washing by water rinses and the rooms with water sprays.

2.4.5 Abattoir campus

- ❖ Roadways and yards in the immediate vicinity of the slaughter hall and other premises should always be kept clean and free from any objectionable odor.
- ❖ Any garbage material should be immediately collected and disposed of to the designated waste disposal area at least daily.
- ❖ The manure should be collected and bayed near the lairage every day on the dirty side of the compound and transported out of the abattoir at least once a week.

2.4.6 Meat transport vehicles

Meat transport vehicles should be washed clean as soon as they enter to the gate of the abattoir by using high-pressure water detergent solution spray and rinsed by water.

2.4.7 Drying after cleaning

- ❖ Equipment should be left dry as soon as possible after cleaning by air-drying.
- ❖ Cloths should not be used for drying, as these only spreads contamination.
- ❖ Adequate drainage points should be provided in equipment that cannot be dismantled and drying racks provided for small pieces.

2.5 Equipment and clothing storage

- ❖ All knives, scabbards, hooks, and other tools used by employees, as well as their work clothing such as aprons should be stored on rust-resistant racks or multiple scabbards, and not in clothes lockers.
- ❖ If locker storage for personal tools of employees is used, the facilities should be separate from those used for clothing

2.6 Equipment

- ❖ Meat contact surfaces of equipment should be constructed with materials that are, smooth; non-corrosive; rust-resistant; non-toxic; non-absorbent; and durable enough to withstand repeated cycles of cleaning and sanitizing.
- ❖ Materials that are not acceptable for equipment that has contact with edible meat products include copper; cadmium; lead; corroded metals; equipment with painted surfaces; containers or equipment made of enamel ware or porcelain used for handling and processing meat products; and wood, plasterboard, or porous acoustic-type boards on any exposed surface that is not appropriately sealed.
- ❖ Equipment made of stainless steel and easy to clean are recommended.
- ❖ The use of wood in meat production and handling areas is prohibited
- ❖ Cloths should not be used for drying, as these only spreads contamination.
- ❖ Aluminum may pit and corrode when exposed to certain chemicals. When friction occurs between aluminum and meat or fat, a black oxide is produced which discolors the meat. The use of aluminum is therefore should be limited to applications where the metal does not directly contact with meat.
- ❖ Portable equipment used for the collection, holding and transfer of condemned and other inedible material should be of rust-resistant metal and be watertight. They should be distinctly and uniformly marked for easy identification.

- ❖ Painted racks are not suitable for use in a high moisture areas

2.7 Vermin (pest) control

2.7.1 Insects

- ❖ Excellent housekeeping program, along with the use of screens, air curtains, and electrical insect control devices and elimination of all places where the insects can breed and hide are the first steps in avoiding the introduction of insects and rodents.
- ❖ Insecticides should only be used if other precautionary measures cannot be effectively used.
- ❖ The insecticides that are applied should be restricted only to those listed by the federal or regional regulatory authorities.
- ❖ Each insecticide should be specifically formulated for designated use and places with the full awareness of the inspection staff.
- ❖ Before insecticides application, care should be taken to safeguard all meat, equipment and utensils from contamination.
- ❖ After application, contaminated equipment and utensils with insecticides should be thoroughly cleaned prior to using them again.

2.7.2 Rodents

Rodent control is facilitated by the elimination of rodent harborages in surrounding areas as well as in the abattoir through the elimination of food supply for rodents or, the destruction of rodents. Rodent destruction can be performed either by the use of traps or by use of poisons. Traps can be used in areas where the use of rodenticides may be hazardous and where there is light infestation. They should be checked at least every 24 hours.

In using rodenticides, the following guidelines should be followed:

- ❖ The places where the rodenticides are placed should be identified and adequately supervised by the inspection staff.
- ❖ All bait stations should have a cover and should be removed from edible product rooms and areas before the commencement of daily operations.

- ❖ Only designated abattoir employees who have a thorough understanding of the potential hazards to health resulting from the use of these agents, under adequate inspection control, should prepare and use such materials.
- ❖ The rodenticides that are applied should be restricted only to those listed by the federal or regional regulatory authorities.

2.8 Disposal of waste products

Storage of manure, paunch and viscera contents in the vicinity of the abattoir is not acceptable. They should be removed from the slaughter hall as soon as they are recovered and transported to designated waste disposal areas without creating any objectionable odor and serving as a breeding place for insects.

3. Pre-slaughter operations

3.1 Stock reception and handling

Meat inspectors and inspector veterinarians should make sure that the following procedures are followed:

- ❖ Livestock reception be conducted in the presence of abattoir livestock handler who is capable of receiving and keep appropriate records.
- ❖ When animals come on truck, make sure they are unloaded quietly as soon as possible after arrival.
- ❖ The condition and state of health of the animals in a lairage should be inspected at least every morning and evening by meat inspector.
- ❖ Animals which are sick, weak, injured or showing visible signs of distress should be separated, and veterinary advice should be sought immediately.
- ❖ As far as possible, established groups of animals should be kept together and each animal should have enough space to stand up, lie down and turn around.
- ❖ Mixing of different species of animals should be avoided.
- ❖ Aggressive horned animals and females on estrous should be penned separately.
- ❖ Fractious animals should not be penned with other animals.
- ❖ Where ties are used, they should allow animals to stand up and lie down without causing injury or distress.

- ❖ Animals should be kept securely in the lairage, and care should be taken to prevent them from escaping and from predators.
- ❖ Potable drinking water should always be provided to all animals, including those kept in the isolation or suspect pen.
- ❖ Feed should be supplied to slaughter animals if they are to be kept for more than 12 hours before slaughter. But for those animals that are slaughtered using Halal (Muslim) slaughter method, feed can be provided all the time animals stay in the lairage.
- ❖ Provide a period of 12-72 hours rest for in the lairage before slaughter
- ❖ The lairage area should be well lit in order to enable the animals to see clearly.

3.2 Ante mortem inspection

Ante-mortem inspection consists of examining the live animals, separating those which appear abnormal or diseased and, passing the rest for slaughter. The specific procedures outlined in the “Meat Inspection Guidelines for Domestic Abattoirs” should be applied.

The meat inspectors should follow the following guidelines:

- ❖ Verify that the animals do not have dirty hide, skin or fleece conditions which cause risk of contamination of the meat.
- ❖ Verify that the animals are healthy and are in a satisfactory state as regards to welfare.
- ❖ If an animal is kept for more than 24 hours after its post-arrival ante-mortem inspection, the ante-mortem inspection should be repeated so that it takes place within 24 hours of slaughter.
- ❖ Only animals that are judged to be sufficiently rested should proceed to slaughter and should not be withheld from slaughter any longer than necessary.
- ❖ Ante-mortem inspection should be carried out where the animals can be observed both collectively and individually at rest and motion.
- ❖ While inspecting at rest the inspector should position her/himself at various locations outside the pen and observe all animals and note their general behavior while they are at rest. The inspector should determine if any of the animals show abnormal behavioral patterns such as excessive excitability or severe depression and also

should look at the heads, necks, sides, rumps, and legs of as many animals and make a note of any abnormalities.

- ❖ While inspecting in motion the inspector should take the following precautions:
 - Should position her/himself outside the pen next to the open gate to easily view the animals as they are driven and direct the abattoir employee to move all animals slowly and individually back and forth, while she/he observes each animal for abnormalities by viewing the head, neck, shoulder, flank, legs, and rump.
 - The inspector should not make in-motion inspection immediately behind a loose, swinging gate and should not position her/himself in a corner or in a place that allows no escape to safety should an animal turn aggressive.
 - The inspector should not climb on high, unstable fences to view the animals during ante-mortem inspection and use safety helmet if required.
- ❖ Animals showing clinical signs of disease should be held for veterinary examination and judgement. They are treated as “suspects” and should be segregated from the healthy animals.
- ❖ Dead and condemned animals to be destroyed during ante-mortem inspection should not be allowed to go to the clean area of the abattoir.
- ❖ Results of ante-mortem inspection should be made available to the competent person undertaking post-mortem inspection before carcasses are examined at the postmortem inspection point

3.3 Pre-operational checks

Slaughter should not commence before all areas, rooms and equipment have been cleaned and disinfected. In order to check up on the effectiveness of the cleaning and disinfection processes a pre-slaughter inspection of the abattoir should be conducted and appropriate measures taken if problems detected.

3.4 Moving livestock to the slaughter hall

- ❖ Only those animals certified by the meat inspector as fit for slaughter are to be moved to the slaughter hall
- ❖ Moving of animals to the slaughter hall should be carried out with the minimum of excitement of the animals.
- ❖ Animals with extremely wide horns or pronounced lameness should not be introduced in to the lead-up race unless they are able to move freely along the race.
- ❖ Animals dislike going from light to dark and will avoid shadows so that gaps under doors should be avoided.
- ❖ Sticks, metal pipes, or pointed objects should not be used for moving livestock. Canvas or leather flappers, soft polythene pipes and rattles are recommended.
- ❖ Gates should not be used for forcing an animal along races.

3.5 Stunning

The meat inspector should ensure that animals be stunned in compliance with the following procedures:

- ❖ No animal should be stunned, slaughtered or dressed in an abattoir unless the meat inspector is present.
- ❖ Stunning should be carried out in a manner that animals do not regain consciousness while being slaughtered,
- ❖ The equipment used for stunning should be maintained and operated properly in accordance with the manufacturer's recommendations and should be applied correctly.
- ❖ Backup stunning devices should be available for immediate use if the primary method of stunning fails.
- ❖ There should be no more than one animal in stunning box at each time and animals are not left in stunning box during breaks.
- ❖ At the time of stunning, animals should be adequately restrained
- ❖ The head of each animal confined in a stunning box should be securely fastened to enable the animal be stunned with little pain
- ❖ The stunning operation should be carried out by a trained person.

- ❖ Each animal should be stunned and subsequently bled before each operator moves to the next animal.
- ❖ If the animal regains consciousness it should be re-stunned before being slaughtered.

The following methods can be used for stunning animals:

- ❖ Camels over six months old — firearm or captive bolt can be used in stunning by the poll or frontal methods. Trained camels should be sat down before stunning. For mature bull camels the captive bolt, if used, should only be applied to the poll position.

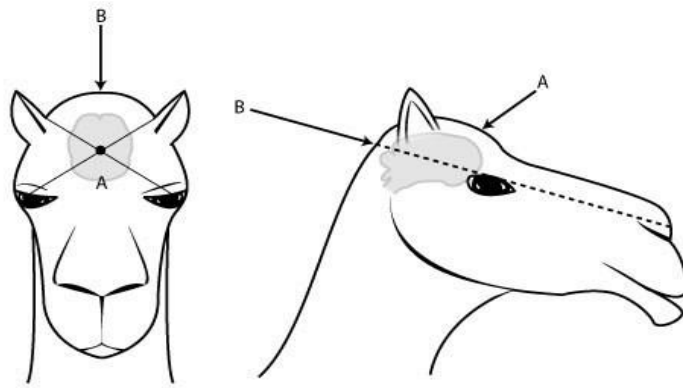


Fig 3. Camel stunning points (poll and frontal methods) of the captive bolt method

- ❖ To stun adult cattle — firearms or captive bolt can be used. The frontal position should be employed. This is the intersection of imaginary lines connecting the outer canthus of each eye with the opposite ear. People who use a captive bolt pistol for stunning cattle should know where to stand. The operator should never stand in front of the animal, as it will jerk its head away when the pistol is aimed. The best position for the operator is just behind the animal's head. When it looks up, the pistol can be quickly brought into position and fired. A light above the stunning box encourages the animals to look up.

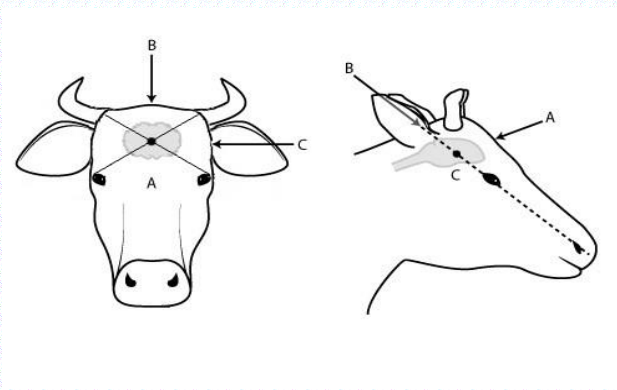


Fig. 4: Stunning points for horned cattle of the captive bolt method

- ❖ For goats and sheep over six months old —slaughtering can be used without stunning.

4. Slaughter and dressing operations

4.1 General dressing requirements

- ❖ No dressing procedure shall begin if there is any potential return of a stunned animal to signs consciousness.
- ❖ Carcasses should be dressed after being suspended by the hind legs.
- ❖ The identity of the carcass and all its parts should be maintained throughout the dressing process and until the post mortem inspection is completed.
- ❖ Any contaminated area on the carcass or its parts should be trimmed out. Washing is not sufficient for the removal of visible contamination.
- ❖ No person removes offal or viscera from the viscera table until it has been inspected and given permission by the inspector.
- ❖ Carcasses should be spaced so that un-skinned carcasses do not come into contact with any other carcass, carcass parts, floors, walls or other structures.
- ❖ Under no circumstance, skinning, evisceration and other preparation of animals condemned on ante-mortem inspection, or found dead, is done on the killing floor but should be carried out in a special area reserved for that purpose.

4.2 Slaughter

- ❖ The slaughtering operation should be carried out by trained personnel and should apply correct shackling and hoisting procedures.
- ❖ The slaughter method involves cutting the throat and bleeding to death.

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- ❖ Cutting both carotid arteries and jugular veins results in brain failure with consequent unconsciousness, but when only one carotid artery is cut brain failure will not occur within approximately seventy seconds. If the carotids are missed altogether and only the jugulars are cut the animal can take as long as five minutes to die. Therefore, the aim should be to ensure that both carotid arteries and jugular veins are cut and separated as expeditiously and physically as possible.
- ❖ In stunned animals, they should be promptly shackled, hoisted and conveyed to a properly constructed bleeding area, and then bled or slaughtered.
- ❖ An animal should be bled within 60 seconds after stunning
- ❖ In animals slaughtered without stunning, slaughtering should be done on a bleeding table instantaneously and the carcass is then shackled and hoisted.
- ❖ No animal should be slaughtered in the sight of any other animal awaiting slaughter.
- ❖ Sufficient space and time should be made available for bleeding so that blood will be confined to the bleeding area.
- ❖ knives should not be wiped “clean” on hides, pelts or cloths, they should not be laid on floor, hand washbasins or platforms but instead knives should be frequently washed and sterilized.
- ❖ The slaughtering knives should be adequately rinsed and sanitized between each animal. Heat causes blood to coagulate, so the knife should be rinsed with cold water before it is placed in the sterilizer.
- ❖ Blood intended for edible purposes should be collected without contamination
- ❖ Heads and feet should not be removed while the animal is still bleeding.
- ❖ After the animal is being slaughtered, bleeding should normally continue for at least 6-8 minutes for cattle and 3-4 minutes for sheep. If shorter periods are allowed, blood will drip on the dressing floor, causing contamination in this work area.
- ❖ Blood should not be allowed to enter to the drainage system but should be collected in a bleeding trough.
- ❖ Immediately after slaughter and before head is removed, numbered tags should be placed on each head and carcass of the slaughtered animal.

- ❖ No person commences to dress a slaughtered animal until the flow of blood has ceased and life is extinct.

4.3 Ripping

- ❖ The removal of the hide or skin begins by making cutting (ripping) lines by using a sharp tipped and straight bladed knife.
- ❖ The skin should be cut from inside out to prevent carcass contamination with hair and dirt.
- ❖ Knives should be rinsed clean after ripping and before proceeding to the next operations.

4.4 Hide and skin removal

The following guidelines should be followed:

- Skinning should begin at the hind shanks and proceed downward, in such a way that its outer surface rolls away from the carcass.
- Except for the original incisions for sticking and starting the skinning operations at the poll and shanks, incision into the skin should be made with the knife blade directed toward the hair side of the skin to prevent contaminating the flesh with cut hair.
- Carcasses should be kept sufficiently far apart from each other to prevent contamination from skinned parts of adjacent carcasses.
- To avoid shank contamination, the lower skinning should not begin until the carcass has passed the points of common contact, such as hindquarter skinning platforms and, the fore shanks is left on until the brisket and fore shanks are partially skinned.
- When using mechanical hide or skin pullers, tremendous energy exerted during the final removal of the hide is not generating aerosols and air flow; any aerosols created at this stage should be directed away from the carcasses being skinned to prevent contamination of the carcasses.

4.5 Feet removal

- Feet removal starts by skinning the area above and below the carpal and tarsal joints and making circular incisions around these joints

- The front and hind feet should be removed before any other incision is made in to the carcass.
- In removing the front feet, care should be taken to expose the tissues of the fore shank as little as possible and leave a "tie" of the hide completely covering the shank as far down as possible toward the carpal articulation where the cut is made to remove the foot.
- Feet should be removed without contacting the hide or skin, and be placed in a container before taking them to the inedible room.

4.6 Pizzle or udder removal

- Penis, prepuce and lactating udders should be carefully removed without contaminating the carcass.
- Mammary lymph nodes should remain on the carcass until the inspection is completed.
- Unless retained for inspection, udders should be sent to the condemned and inedible offal room.

4.7 Bung (rectum) dropping

- A circular cut should be made around the anus and vulva taking care to leave the anal sphincter intact.
- Anus and rectum should be freed from the surrounding tissue with a clean knife.
- Bung (rectum) should be pulled out using a hook or other device, and tie it firmly, along with the neck of the urinary bladder, and then drop into the pelvic cavity so that fecal matter or urine may not escape and contaminating the carcass.
- Any small pieces of skin left on the anal region should be removed before returning to the pelvic cavity.

4.8 Head removal

- ❖ The heads should be removed from the carcass in such a manner to avoid soiling them with rumen contents (this can usually be accomplished by tying the esophagus and then pulling the head sharply to the side as the gullet is cut).
- ❖ There should be no contamination of heads or other skinned areas of the neck by coming in contact with other heads and carcasses, the floor, or fixed objects.

- ❖ Removed heads should be taken to the headroom and hanged by their mandible.
- ❖ The employee who removes heads should wash his hands and sanitize his knives after each head removal.
- ❖ Prior to washing, the horns, all pieces of hide, and eardrums should be removed from each head and the equipment used for holding heads for trimming and dehorning is cleaned between each head.
- ❖ The washing of heads should be done in compartments or areas that will control the splash of wastewater to prevent contamination of other heads or adjacent carcasses.
- ❖ The oral and both nasal cavities should be thoroughly flushed before washing the outer surfaces of each head.

4.9 Esophagus rodding and tying

The esophagus of slaughtered animals is removed through the diaphragm and thoracic cavity without rupture, by separating the esophagus from the trachea, lungs and surrounding tissue by rodding instrument and effectively tied before evisceration.

4.10 Evisceration

- ❖ Any contaminated part on the carcass should be trimmed off from the midline before opening the abdominal cavity.
- ❖ A small starting cut should be made on the caudal ventral side of the abdominal muscle and extend the incision downward to the chest area as much as sufficient space is available.
- ❖ The incision into the pelvic cavity to "ring" the bung should be made by a person with clean hands and a clean knife.
- ❖ Care should be taken to avoid cutting or breaking the paunch and intestines, and prior to evisceration, the rectum and neck of the bladder are secured to prevent urine and fecal leakage.
- ❖ At the time of evisceration, ties are made at the point where the small intestine leaves the stomach and at the point where the esophagus attaches to the paunch; at each of

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these two named points, two ties are made about 10 centimeters apart with the contents being stripped from the intervening portion of the intestine or esophagus, respectively, before the second tie is made so that the tissues can be severed between the ties without any spillage of contents.

- ❖ The removed viscera should be placed on the viscera inspection table.
- ❖ The thoracic viscera should be removed after the removal of the abdominal viscera is completed and placed in the viscera table.
- ❖ The uro-genital organs such as bladder, ovaries and uterus, should be removed in total without incising them, and transfer to inedible room.
- ❖ The eviscerator should not cut into any organ, nor he removes the gall bladder from the liver; and the gall bladder is not emptied on to the floor.
- ❖ After evisceration, the viscera should be identified by a similar number (tag), which was attached to the head and carcass
- ❖ While accidental contamination may occur, contaminated carcasses should be trimmed but not washed.
- ❖ The eviscerator should not flush out carcass cavities
- ❖ Hands should be washed regularly during the evisceration process.
- ❖ If the eviscerating knife is contaminated while evisceration is being done, it should be sanitized before reuse
- ❖ Contaminated footwear, apron, or knives should be thoroughly cleaned and disinfected.
- ❖ The saw or other instrument used to split the brisket should be disinfected after each use.
- ❖ No offal or viscera be removed from the viscera table until inspection is completed.
- ❖ Work-up operations on the viscera table are to be kept to a minimum until after inspection and maintain identification of the viscera with the carcass.
- ❖ Hepatic lymph nodes are to remain attached to the liver for inspection purposes.

- ❖ Kidneys should either be presented for inspection with other edible offal, or left hanging on the carcass by their attachments.

4.11 Carcass trimming

- ❖ Trimming should be carried out before and after inspection
- ❖ The trimmer should remove hair, blood clots, pieces of hide, flecks of rail and other dust, and minor amounts of faecal material or stain
- ❖ Bruising or pathological lesions should not be trimmed before inspection.

4.12 Postmortem inspection

The head, viscera and carcass of each slaughter animal should be inspected by the inspector based on the guidelines indicated in the Meat Inspection Guidelines for Domestic Abattoirs. The activities include the following:

- During presentation for inspection, the identity of the head, viscera and carcass should be maintained.
- No unnecessary and injudicious cuts, excisions and marks are made on carcasses during the meat inspection and care should be taken to avoid any unnecessary soiling, contamination or mutilation.

Based on the decisions of the inspector veterinarian, the abattoir employee should transfer the inspected products in to appropriate locations as indicated below:

- ❖ Those parts of carcasses or viscera which are free from diseases or gross contamination and considered safe for human consumption should be transferred to:
 - The whole or part of the carcass to the next stage of carcass wash room.
 - Those parts of viscera (stomach and intestines) to the casing cleaning room
 - The edible offals (such as heart, liver, head together with tongue, etc.) to offal preparation room
 - Inedible offals (such as lungs etc.) should be put in large cans (containers) marked "inedible" and transferred to condemned and inedible room.

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- ❖ Those parts of carcass or viscera which may need further check-up by the inspecting veterinarian should be transferred to the product detaining room.
- ❖ Those parts of carcass or viscera, which are not fit for human consumption, should be transferred to the condemned and inedible room.
- ❖ No person removes from an abattoir a carcass, meat, viscera or animal product which has been detained or condemned without the authorization of the inspector veterinarian in charge.

4.13 Carcass washing

- ❖ Carcass re-trimming should be done after inspection if there is still a need of removing any remnants of stick wounds, any residual pieces of hide, blood clots, bruised tissue and contamination before washing.
- ❖ All carcasses should be washed to remove blood and bone dust.
- ❖ Carcass washing should be done from top to down wards with a flow rate of 10 liters per minute for about 30-60 seconds.
- ❖ After washing, carcasses should be allowed to stay in the slaughter floor for about 30 minutes until the water is dripped out of the carcass so that stamping can easily be done.

4.14 Marking and branding

The application of information to carcasses and parts or their containers by a brand or mark is a fast, distinctive, and durable method of identification.

- ❖ All carcasses after being approved at inspection and as soon as the carcass is dry enough to hold the ink, should be legibly branded with the official inspection legend (Inspected and passed).
- ❖ Brands are to be applied by abattoir employee under the direct supervision of the meat inspector.
- ❖ No person may place a stamp of approval on, or remove such mark from any carcass except under the supervision of the veterinary inspector.

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- ❖ All carcasses are to be branded legibly with inspection legend after inspection with four stamps per side (on neck, thoracic, abdominal and hind quarter areas) and one stamp on each of the left and right peritoneum (a total of 10 stamps per carcass).
- ❖ All stamps or roller marks used to mark any carcass or meat should be constructed of a non-toxic, noncorrosive material and should be so constructed as to be readily cleanable.
- ❖ The stamps should contain the abattoir identification number; and the wording “Inspected and Passed” should be written in the local (regional) and Amharic languages.
- ❖ The use of the Meat Inspection Legend is only permitted in connection with edible meat products slaughtered in a registered and licensed domestic abattoir.
- ❖ The Meat Inspection Legend should be applied to the carcass but not be used on inedible meat products.
- ❖ The stamp of approval should be kept and used under control of the meat inspector;
- ❖ Stamps and roller marking equipment should be kept hygienically, away from the floor and other dirty surfaces and be cleaned and sterilized regularly during use.

4.15 Edible offal room operations

Different carcass parts or offals can be harvested for human consumption in spite of existence of preference variations among different cultural or religious groups. The following guidelines should be followed:

4.15.1 Red offal

- ❖ Red offal should be washed with clean running water, hung on hooks.
- ❖ Red offal should not be stored, or come into contact, with rough offal.

Head

- ❖ Head meat can be harvested for human consumption only after the post mortem inspection is completed and the carcass has been passed.
- ❖ The intact head should be skinned and visibly clean. The nasal and oral cavities should be flushed before the head is presented for inspection.

- ❖ Cheek meat should be trimmed free of the salivary glands and mucous membranes and washed thoroughly.
- ❖ If firearms are used for stunning, the cheek meat cannot be harvested because of the lead fragments that may enter in to the cheek muscles.

Tongue: Tongues should be trimmed to remove any portions of the larynx, epiglottis, or tonsils. The severed base of the tongue should be trimmed if there is any contamination and washed.

Heart: Hearts should be cut open or inverted to permit the complete removal of all blood clots. The aorta and other major blood vessels are to be removed to within 2 cm of their origin from the external surface of the heart to the end of the cut vessels. After washing, hearts should be drained.

Liver: The gall bladder should be removed from the liver but can be harvested separately as edible if there is a need to do so. The inspector should open the hepatic ducts longitudinally and examine them for the presence of liver flukes. Livers with defects such as parasites (e.g. flukes), lump, tumors, abscess should not be harvested for human consumption.

Kidneys: Kidneys from food animals can be harvested as an edible product.

Oesophagus meat: The oesophagus can be harvested by cutting through its musculature distally adjacent to the rumen/stomach without cutting into the mucosal lumen. The oesophagus is then pulled away from the rumen/stomach.

4.15.2 Washing of rough offal

- Rough offal should be removed from the dressing room to the offal room where paunches and intestines should be separated and emptied of its contents; washed with clean running water; and hung on hooks for drip drying.
- Equipment should be provided for emptying of rumens and intestines and the ruminal and intestinal content should be removed continuously.

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- Only carcass parts harvested under hygienic conditions, derived from approved carcasses, and free of pathological lesions should be identified as edible meat products.
- The identity of these parts should be maintained until the corresponding dressed carcass is approved.

4.16 Condemned and inedible room operations

Condemned and inedible products should be handled carefully and disposed of in a sanitary manner following the guidelines indicated below:

- ❖ The condemned materials, which were transferred from the slaughter hall, should stay in the condemned room until they are treated by the veterinarian to make them obviously unfit for human meat (by sight, smell, or taste by adding certain chemicals such as powdered charcoal, kerosen, food grade dyes, etc.)
- ❖ Dead and condemned animals to be destroyed during ant-mortem inspection should not be taken away from the condemned and inedible room until rendered inedible by the veterinarian.
- ❖ When a carcass is condemned an inspector veterinarian should put a "*Condemned*" mark on its outer surface to make identification obvious.
- ❖ Containers used for condemned meat products should be distinctly marked "*Condemned*". They should be preferably of a color that distinguishes them from containers used for edible meat products.
- ❖ Immediately after disposal, any receptacle (container) coming in to contact with the condemned products should be cleaned & disinfected properly.
- ❖ Livestock owners can salvage certain condemned meat products, which may be unfit for human consumption but be safe for pet animals, with the consent of the inspector veterinarian.
- ❖ Denaturing is required to clearly distinguish such pet animal meat products from those prepared and approved for human consumption by adding charcoal or another denaturing agent to the meat product.

4.17 Inedible meat products handling

- ❖ Inedible meat products such as lungs, spleen, uterus, ovaries, udder and others should stay until they are treated by the meat inspector or inspector veterinarian to make them obviously unfit for human consumption (by sight, smell, or taste).
- ❖ Other by-products such as horns and hoofs should be disposed of away from the abattoir's campus.

4.18 Dispatching and meat transport

The meat inspectors should ensure that the meat and meat products are delivered to the customer or retailers in unaltered in manner that will not affect their fitness for human consumption. They have to ensure that the meat and meat products are dispatched directly from the abattoir's dispatch area and transported in the following manner:

- ❖ Meat approved for human consumption should be transported from the abattoir to the retail shops by using dedicated meat transport vehicles
- ❖ Meat should not be placed in any form of transport vehicle that has not been cleaned and sanitized before loading.
- ❖ Carcasses, sides and quarters should be hung during transport and should not come in to contact with the floor.
- ❖ No person shall be allowed to stay in the compartment where meat is kept during transport.
- ❖ The engine of a carrier shall not be allowed to run whilst loading or un-loading is in process and all doors and lids shall be securely closed before the engine is started.
- ❖ Fueling of carriers shall not take place whilst the doors or the lids of a carrier are open.
- ❖ For transporting of meat for less than two hours duration; the meat may be transported in non-insulated vehicles provided that they are fitted with sub-protection in the form of a double roof, the components of which shall be not less than 4 centimeters apart. Meat transport trucks should be fitted with a roof-top rotating ventilator and air outlets to provide for adequate ventilation.

- ❖ Where human labor is required for loading and unloading of carcasses during transportation, personnel should be healthy and neatly dressed with proper protective clothing

4.18.1 Meat transport vehicle compliance requirements

- ❖ For the transportation of carcass meat, whether in whole carcass sides, quarters or boned cut meat, rails shall be used and constructed as follows:
 - the hooks on rails shall be of such a construction as to prevent the meat from falling down during transportation;
 - minimum rail spacing for hindquarters and boned cut meat shall be 40 centimeters and for forequarters 35 centimeters;
 - minimum space between rails shall be 60 centimeters;
- ❖ Vehicle design should permit effective inspection, cleaning, disinfection.
- ❖ Vehicles should be designed and built to make locking and sealing easy, protect the meat against extremes of heat and prevent infestation by pests.
- ❖ Vehicle body should be sufficiently insulated and be in good repair with no holes in the body that might allow heat, dust, or other adulterants to enter the vehicle.
- ❖ Vehicle doors and seals should be securely closed.
- ❖ Vehicles used for the transport of meat and edible products should be used exclusively for this purpose and should be clean at the point of loading.
- ❖ Ensure any equipment or surfaces that contact meat products are made of nontoxic, noncorrosive materials that can be effectively cleaned. For example, the surfaces may be made with stainless steel or be coated with food-grade epoxy resins.
- ❖ Vehicle internal surfaces including the floor should be light colored that allows visible contamination to be seen easily, impervious, corrosion resistant, non-toxic and made of a durable material that can be sanitized easily.
- ❖ Vehicle floor to wall and wall to wall junctions should be rounded.
- ❖ Vehicles should have an overhead rail for carcass transport.

4.18.2 Loading of meat

- Workers should wear clean protective clothing.
- Loading surroundings and equipment should be ensured that they are clean from possible contamination.
- Rough offal should not be loaded in the same loading space as carcasses, portions or red offal, unless such rough offal is kept in clean, waterproof containers with tight fitting lids.

Part IV: Operational procedures for grade D abattoirs

1. Abattoir organization and sanitary control

The meat inspector should ensure that the abattoir is registered by the regional regulatory authority and approved to slaughter animals to sale for human consumption. He also should ensure that the meat production process moves in one direction without any cross flow which may adversely affect the hygiene of the meat product.

The meat inspector should ensure that:

- ❖ There is a written and acceptable cleaning and sanitation program for the entire premises of the abattoir and daily monitor its implementation.
- ❖ Employees working in the abattoir get training on personal hygiene and sanitary procedures by the meat inspection service
- ❖ All equipment and tools are cleaned and sanitized before starting the slaughter and dressing operations.
- ❖ All abattoir employees implement hygiene practices and sanitary working habits
- ❖ In the event of detecting sanitation problems, stop the slaughter and dressing operations and order the abattoir management and employees to take appropriate corrective actions

The meat inspector should ensure that:

- ❖ Persons who come in contact with meat in the course of their work should have a medical examination prior to their employment.
- ❖ All meat handlers should be given appropriate training in personal hygiene and hygienic handling of meat.

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- ❖ No person should be permitted to work in any meat handling area while known or suspected to be suffering from a disease likely typhoid, dysentery, cholera or while afflicted with infected wounds, skin infections, sores or with diarrhea.
- ❖ Any person who has a cut or wound should not be allowed to handle meat or meat contact surfaces until the injury is completely protected by a water proof covering which is firmly secured.

All meat handlers in the abattoir should comply with the following guidelines:

- Use of chewing gum, snuff and tobacco in the meat handling areas is prohibited.
- Scratching of the head, face, placing of fingers in or around the mouth or nose, coughing, sneezing and spitting should be avoided. If in case, unavoidably happens, hands should be cleaned after each episode.
- Hand wash facilities should be used by everyone upon entering the meat production area.
- Hands should always be washed and disinfected immediately, with 100ppm chlorine or liquid soap under running warm water, before commencing work after using the toilet or handling any material, which might be capable of transmitting disease.
- Every person should wash his hands thoroughly as soon as his hands come in contact with blood or any other dirt with hand cleaning preparation such as liquid soap.
- Fingernails should not be excessively long and should be kept clean.
- Employees should be neatly and cleanly dressed, wear head coverings that properly cover their hair

The meat inspectors should ensure that the abattoir management enforces compliance of the following clothing guidelines:

- ❖ Any person entering a meat handling area should wear protective clothing covering at least the head, shoes and a coat that covers up to the knee.
- ❖ All personnel engaged in handling unprotected meat should wear a clean waterproof covering that covers at least the worker's body to the full extent of the potential meat contact zone
- ❖ All personnel who are required to handle unprotected meat should wear footwear that can be effectively cleaned before entering any meat handling area.

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- ❖ Staff who may lift beef quarters or sheep and goat carcasses should wear clean and water proof protective neck shields, or hooded overalls.
- ❖ Protective clothing should be provided in such a number as to be sufficient for the abattoir employees and meat inspectors for changing every day.
- ❖ Gloves may be worn by all personnel engaged in handling unprotected meat products.
- ❖ Hands should be cleaned before gloves are donned and after gloves are removed.
- ❖ Meat handlers should change their protective clothing if it becomes excessively soiled
- ❖ Those types of protective clothing such as aprons and foot wears should be washed by hand held sprays as soon as contaminated by blood or gut contents.
- ❖ Each set of protective clothing should be washed and ironed at the end of the day's operation.
- ❖ If any hand tool and equipment such as knives are found contaminated with blood, gut content or any dirt matter during slaughtering, flaying and other subsequent operations, they should be sanitized (washed in a sanitizing solution such as a 200 ppm chlorine solution and rinse them in water) before proceeding to the next activity.
- ❖ Hand tools such as knives used to slaughter or dress one animal or a carcass should be washed before re-using it for slaughtering any other animal or dressing a carcass.
- ❖ At the end of operations, work clothing and equipment such as knives, hooks, steels, mesh gloves, etc should be cleaned and sanitized and be available for the next pre-operational inspection.
- ❖ Unauthorized personnel, non-slaughter animals such as dogs and cats, wild birds and vermin should be kept out of the abattoir compound.

2. Cleaning program

The inspector should enable the abattoir management to have a written cleaning program for the entire premises of the abattoir. The abattoir management should own the responsibility of implementing and monitoring the activities. For the slaughter operations to begin, the inspector should carry out a pre-operational inspection for effectiveness of the cleaning program.

- ❖ Good hygiene demands effective and regular cleaning of abattoir's premises, equipment and meat transport vehicles.

- ❖ Cleaning operations should include areas such as lairages, stunning & bleeding chambers, slaughter hall, offal and hide rooms, toilets and all types of equipment.
- ❖ Water used for cleaning, hand washing and carcass spraying should be of a potable quality.
- ❖ Detergents should have good wetting capacity and rinsing property, be non- corrosive and compatible with other materials including disinfectants used in the sanitation program.

2.1 General cleaning procedures

Cleaning procedures should include the following:

- ❖ Loosening and removal of pieces of rubbish, blood, faecal and other contaminants by means of dry sweeping, and removing them by picking them up.
- ❖ Pre-wash all equipment, floors and walls with clean water to soften and loosen the remaining particles.
- ❖ Wash and scrub with detergents and water under pressure.
- ❖ Rinse with clean water under pressure in order to remove the loosened particles and detergents properly.
- ❖ Disinfect with a suitable disinfectant at the proper concentration.

2.1.1 Cleaning during working hours

- ❖ During routine operations, feet, hides and skins, offal, waste scraps, condemned carcass or parts should be removed immediately from the slaughter floor and transferred to their respective designated areas.
- ❖ Any hand tools such as knives, hooks, saws, etc., which are used for bleeding, ripping, head and feet removal, skinning, carcass dressing, inspection, etc., should be sanitized by immersing in a tank of water in a 200 ppm chlorine solution and then rinsed with water after being contaminated with dirt matter and/ or using them for one animal or carcass and before reusing them.
- ❖ Those types of protective clothing such as aprons and foot wears should be washed by hand held sprays as soon as contaminated by blood or gut contents

2.1.2 Cleaning after working hours

- ❖ Dry cleaning (removal of the top and gross dirt particles without using water) should be done immediately after completions of slaughtering operations have ceased. This should embrace the whole premises including the lairages.
- ❖ After dry cleaning is completed detergent solution is applied on the surface of the area (walls, floors, surfaces of equipment, etc.) to be cleaned and the equipment and hand tools are immersed in the water detergent solution to loosen soil and bacterial films and holding them in solution or suspension
- ❖ Removal of soil and gross dirt matter by scrubbing from the surface of the walls, floors and equipment and hand tools in the presence of detergent solution
- ❖ Rinsing with water should be applied under pressure.
- ❖ All protective clothing such as aprons, boots, overall, gowns etc. should be cleaned by using a hot detergent water solution and final cold-water rinse, followed by drying and ironing after the end of the day's operation

2.1.3 Cleaning and disinfection at weekly intervals

A more through weekly use of detergents and sanitizers is necessary for areas such as the killing floor; detain room, head room, casing and cleaning room, offal preparation room, condemned and inedible room. Different types of cleaning and disinfection methods in combination or alone can be utilized as required. The commonly used method being:

- ❖ For small item of equipment such as knives, hooks, saws, trays and others, soaking in a detergent solution in a separate receptacle is necessary to loosen the dirt prior to scrubbing.
- ❖ Removal of soil and gross dirt matter by scrubbing from the surface of the walls, floors and

2.1.4 Drying after cleaning

- ❖ After cleaning equipment and tools should be left for air-drying.
- ❖ Cloths should not be used for drying, as these only spreads contamination.
- ❖ Drying racks provided for small pieces

2.2 Specific cleaning procedures

2.2.1 Lairage

At the end of each day's operation, gross debris, dirt and faecal matter should be removed and followed by washing down of floors, walls and partitions using high pressure cold-water spray.

2.2.2 Slaughter hall and accessory departments

- ❖ cold water at low pressure should be used constantly during working hours to remove dirt from the floor and some fixed equipment and to clean operators boots and aprons when contaminated while at work.
- ❖ All mobile equipment and equipment with other smaller hand tools such as knives, hooks, cleavers (saws), trays and others after the end of the day's operation by immersing in batches in tanks containing detergent solution for two minutes and final washing by water rinses.
- ❖ All equipment, which has come in contact with contaminated material or condemned product, should be washed by immersing in sanitizing chlorine water solution of 200 ppm or hot water detergent solution for two minutes and final water rinse before reuse.
- ❖ All hand tools (equipment) such as knives etc. which are used to bleed, skin, dress, inspect etc. one animal or carcass should be washed clean and sanitized by immersing in a sanitizing chlorine water solution of 200 ppm or hot water detergent solution for two minutes and then rinsed with water before reusing them for the next animal or carcass.
- ❖ Those types of protective clothing such as aprons and foot wears should be washed by hand held sprays as soon as contaminated by blood or gut contents
- ❖ All protective clothing such as aprons, boots, overall, gowns etc. should be cleaned by using a detergent water solution and final water rinse, followed by drying and ironing (except for boots and aprons) after the end of the day's operation.

2.2.3 Changing room and toilet

Changing room and toilet should be kept clean at all times and a routine cleaning and disinfection procedure should be conducted during work hours and after the day's operation is finalized.

2.2.4 Condemned and inedible product room

Sanitary conditions should be maintained at all times in the condemned and inedible room by applying daily cleanup activities as follows.

2.2.5 Abattoir campus

- ❖ Roadways and yards in the immediate vicinity of the slaughter hall should always be kept clean and free from any objectionable odor.
- ❖ Any garbage material should be immediately collected and disposed of to the designated waste disposal area daily.
- ❖ The manure should be collected and bayed near the lairage every day on the dirty side of the compound and transported out of the abattoir at least once a week.

2.2.6 Vehicles

Meat transport vehicles should be washed clean as soon as they enter to the gate of the abattoir by using water detergent solution and rinsed by water.

2.2.7 Equipment and clothing storage

- ❖ All knives, scabbards, steels, hooks, and other tools used by employees, as well as their work clothing such as aprons should be stored on rust-resistant racks or multiple scabbards, and not in clothes lockers.
- ❖ If locker storage for personal tools of employees is used, the facilities should be separate from those used for clothing
- ❖ Work clothing should not be worn or stored in incompatible areas (washrooms, outside the abattoir, etc.).

2.2.8 Equipment

Meat inspectors should ensure the following guidelines are considered in the purchase of abattoir equipment to be used for the production of meat:

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- ❖ Meat contact surfaces of equipment should be constructed with materials that are, smooth; non-corrosive; rust-resistant; non-toxic; non-absorbent; and durable enough to withstand repeated cycles of cleaning and sanitizing.
- ❖ Materials that are not acceptable for equipment that has contact with edible meat products include copper; cadmium; lead; corroded metals; equipment with painted surfaces; wood.
- ❖ Equipment made of stainless steel and easy to clean are recommended.
- ❖ Painted racks are not suitable for use as they are subject to chipping and thus resulting in corrosion.

2.3 Vermin (pest) control

Vermin (pest) are capable of introducing serious human diseases through meat products. There should be an effective and continuous program for the control of pests. Pest control programs should not compromise the safety of the meat products and working personnel. Meat inspectors have the responsibility of ensuring implementation of regular abattoir pest control programs in line with accepted guidelines and procedures indicated below.

2.3.1 Insects

- ❖ Excellent housekeeping program, along with the use of screens, air curtains, and electrical insect control devices and elimination of all places where the insects can breed and hide are the first steps in avoiding the introduction of insects and rodents.
- ❖ Insecticides should only be used if other precautionary measures cannot be effectively used.
- ❖ Before insecticides application, care should be taken to safeguard all meat, equipment and utensils from contamination.
- ❖ After application, contaminated equipment and utensils with insecticides should be thoroughly cleaned prior to using them again.
- ❖ The insecticides that are applied should be restricted only to those listed by the federal or regional veterinary authorities.

2.3.2 Rodents

Rodent control is facilitated by the elimination of rodent harborages in surrounding areas as well as in the abattoir through the elimination of food supply for rodents or, the destruction of rodents. Rodent destruction can be performed either by the use of traps or by use of poisons. Traps can be used in areas where the use of rodenticides may be hazardous. They should be checked at least every 24 hours.

In using rodenticides, the following guidelines should be followed:

- ❖ The bait stations (paces where the rodenticides are placed) should be identified and adequately supervised by the inspection staff.
- ❖ All bait stations should have a cover and should be removed from slaughter and dressing areas before the commencement of operations.
- ❖ The rodenticides that are applied should be restricted only to those listed by the federal or regional veterinary authorities.

2.4 Disposal of waste products

Manure, paunch and viscera contents should be removed from the slaughter hall as soon as they are recovered from the animal or emptied from visceral organs and transported to designated waste disposal areas without creating any objectionable odor and serving as a breeding place for insects.

3. Pre-slaughter operations

Slaughter should not commence before all areas, rooms and equipment have been cleaned and disinfected. In order to check up on the effectiveness of the cleaning and disinfection processes a pre-slaughter inspection of the abattoir should be conducted and corrective measures taken if problems detected.

3.1 Stock reception and handling

Meat inspectors should make sure that the following livestock reception and handling procedures are followed accordingly:

- ❖ Conduct livestock reception in the presence of a livestock handler.
- ❖ The condition and state of health of the animals in a lairage should be inspected at least every morning and evening by the meat inspector.

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- ❖ Animals which are sick, weak, injured or showing visible signs of distress should be separated, and veterinary advice should be sought immediately
- ❖ If animals come on truck, make sure they are unloaded as soon as possible quietly to minimize the risk of injury or stress.
- ❖ Animals should have enough space to stand up, lie down and turn around.
- ❖ Different species of animals should not be mixed.
- ❖ Fractious animals should not be penned with other animals.
- ❖ Where ties are used, they should allow animals to stand up and lie down without causing injury or distress.
- ❖ Animals should be kept securely in the lairage, and care should be taken to prevent them from escaping and from predators.
- ❖ Potable drinking water should always be provided to all animals, including those kept in the isolation or suspect pen.
- ❖ Feed should be supplied to slaughter animals to be kept for more than 12 hours before slaughter. But, for those animals to be slaughtered using Halal (Muslim) slaughter method, feed can be provided to animals all the time while they stay in the lairage.
- ❖ Provide a period of 12-72 hours rest before slaughter
- ❖ The lairage area should be well lit in order to enable the animals to see clearly.

3.2 Ante mortem inspection

Ante-mortem inspection consists of examining the live animals, separating those which appear abnormal or diseased and, passing the rest for slaughter. The specific procedures outlined in the “Meat Inspection Guidelines for Domestic Abattoirs” should be followed.

The meat inspectors should ensure implementation of the following measures:

- ❖ Verify that the animals do not have dirty hide, skin or fleece conditions which cause risk of contamination of the meat.
- ❖ Verify that the animals are healthy and are in a satisfactory state as regards to welfare.
- ❖ While inspecting animals, the inspector should position her/himself at various locations outside the pen and observe all animals and note their general behavior.

- ❖ Animals showing clinical signs of disease should be segregated from the healthy animals.
- ❖ Dead and condemned animals to be destroyed during ant-mortem inspection should not be allowed to go to the slaughter floor of the abattoir.

3.3 Moving livestock to the slaughter hall

- ❖ Only those animals certified by the meat inspector as fit for slaughter are to be moved to the slaughter hall
- ❖ Moving of animals to the slaughter hall should be carried out with the minimum of excitement of the animals.
- ❖ Sticks, metal pipes, or pointed objects should not be used for moving livestock. Canvas or leather flappers, soft polythene pipes and rattles are recommended.

4. Slaughter and dressing operations

4.1 Slaughter

- ❖ All animals should be instantaneously slaughtered by means of instruments capable of instantaneously rendering the animal insensible to pain until death supervenes.
- ❖ Slaughtering should be done on a bleeding table instantaneously and the carcass is then shackled and hoisted.
- ❖ The slaughter method involves cutting the throat and bleeding to death.
- ❖ Knives should be sharp and two knife systems are in use and sterilizer temperature records are available at all times (knives should not be wiped “clean” on hides, pelts or cloths, they should not be laid on floor, hand washbasins or platforms but instead knives should be frequently washed and sterilized).
- ❖ The slaughtering knives should be adequately rinsed and sanitized between each animal.
- ❖ The slaughter man should allow sufficient amount of time for bleeding that dressing operations should not start before the death of each animal. Heads and front feet should not be removed while the animal is still bleeding.
- ❖ After the animal is being slaughtered, bleeding should normally continue for at least 6-8 minutes for cattle and 3-4 minutes for sheep.

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- ❖ Immediately after slaughter and before head is removed, numbered tags should be placed on each head and carcass of the slaughtered animal.
- ❖ No person commences to dress a slaughtered animal until the flow of blood has ceased and life is extinct.
- ❖ Carcasses should be dressed after being suspended by the hind legs.

4.2 Ripping

- ❖ The removal of the hide or skin begins by making cutting (ripping) lines by using a sharp tipped and straight bladed knife.
- ❖ The skin should be cut from inside out to prevent carcass contamination with hair and dirt.
- ❖ Knives should be rinsed clean after ripping and before proceeding to the next operations.

4.3 Hide and skin removal

- ❖ No opening should be made into the chest or abdomen before the hide is removed
- ❖ Skinning should begin at the hind shanks and proceed downward, in such a way that its outer surface rolls away from the carcass.
- ❖ Except for the original incisions for sticking and starting the skinning operations at the poll and shanks, incision into the skin should be made with the knife blade directed toward the hair side of the skin to prevent contaminating the flesh with cut hair.
- ❖ Carcasses should be kept sufficiently far apart from each other to prevent contamination from skinned parts of adjacent carcasses.
- ❖ To avoid shank contamination, the lower skinning should not begin until the carcass has passed the points of common contact, such as hindquarter skinning platforms and, the fore shanks is left on until the brisket and fore shanks are partially skinned.
- ❖ The tail should be skinned out for not causing contamination to the carcass.

4.4 Feet removal

- ❖ Feet removal starts by skinning the area above and below the carpal and tarsal joints and making circular incisions around these joints
- ❖ The front and hind feet should be removed before any other incision is made in to the carcass.

- ❖ In removing the front feet, care should be taken to expose the tissues of the fore shank as little as possible and leave a "tie" of the hide completely covering the shank as far down as possible toward the carpal articulation where the cut is made to remove the foot.

4.5 Pizzle or udder removal

Penis, prepuce and lactating udders should be carefully removed without contaminating the carcass.

4.6 Bung (rectum) dropping

- ❖ A circular cut should be made around the anus and vulva taking care to leave the anal sphincter intact.
- ❖ Anus and rectum should be freed from the surrounding tissue with a clean knife.
- ❖ Bung (rectum) should be pulled out using a hook or other device, and tie it firmly, along with the neck of the urinary bladder, and then drop into the pelvic cavity so that fecal matter or urine may not escape and contaminating the carcass.
- ❖ Any small pieces of skin left on the anal region should be removed before returning to the pelvic cavity.
- ❖ A useful knot for the purpose consists of a loop placed behind the bung, through which one of the ends is passed. The two free ends are then pulled tight using the loop and tied.

4.7 Head removal

- ❖ The heads should be removed from the carcass in such a manner to avoid soiling them with rumen contents by tying the esophagus.
- ❖ There should be no contamination of heads or other skinned areas of the neck by coming in contact with other heads and carcasses, the floor, or fixed objects.
- ❖ Removed heads should be hanged by their mandible.
- ❖ The head skinner should clean and sanitize his knife as frequently as necessary.

4.8 Esophagus rodding and tying

The esophagus of slaughtered animals is removed through the diaphragm and thoracic cavity without rupture, by separating the esophagus from the trachea, lungs and surrounding tissue and tied before evisceration.

4.9 Evisceration

- ❖ Any contaminated part on the carcass should be trimmed off from the midline before opening the abdominal cavity.
- ❖ A small starting cut should be made on the caudal ventral side of the abdominal muscle and extend the incision downward to the chest area as much as sufficient space is available.
- ❖ The incision into the pelvic cavity should be made by a person with clean hands and a clean knife.
- ❖ Care should be taken to avoid cutting or breaking the paunch and intestines, and prior to evisceration, the rectum and neck of the bladder are secured to prevent urine and fecal leakage.
- ❖ At the time of evisceration, ties are made at the point where the small intestine leaves the stomach and at the point where the esophagus attaches to the paunch; at each of these two named points, two ties are made about 10 centimeters apart with the contents being stripped from the intervening portion of the intestine or esophagus, respectively, before the second tie is made so that the tissues can be severed between the ties without any spillage of contents.
- ❖ The thoracic viscera should be removed after the removal of the abdominal viscera is completed.
- ❖ The uro-genital organs such as bladder, ovaries and uterus, should be removed in total without incising them.
- ❖ The eviscerator should not cut into any organ, nor he removes the gall bladder from the liver; and the gall bladder is not emptied on to the floor.
- ❖ After evisceration, the viscera should be identified by a similar number (tag), which was attached to the head and carcass
- ❖ While accidental contamination may occur, contaminated carcasses should be trimmed but not washed.
- ❖ Hands should be washed regularly during the evisceration process.

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- ❖ If the eviscerating knife is contaminated while evisceration is being done, it should be cleaned before reuse
- ❖ Contaminated footwear, apron, or knives should be thoroughly cleaned.
- ❖ The saw or other instrument used to split the brisket should be disinfected after each use.
- ❖ No offal or viscera be removed from the viscera table until inspection is completed.
- ❖ Hepatic lymph nodes are to remain attached to the liver for inspection purposes.
- ❖ Kidneys should either be presented for inspection with other edible offal, or left hanging on the carcass by their attachments.

4.10 Carcass trimming

- ❖ Trimming should be carried out before and after inspection
- ❖ The trimmer should remove hair, blood clots, pieces of hide, flecks of rail and other dust, and minor amounts of faecal material or stain
- ❖ Bruising or pathological lesions should not be trimmed before inspection.

4.11 Postmortem inspection

The head, viscera and carcass of each slaughter animal should be inspected by the inspector based on the guidelines indicated in the Meat Inspection Guidelines for Domestic Abattoirs. The activities include the following:

- ❖ During presentation for inspection, the identity of the head, viscera and carcass should be maintained.
- ❖ No unnecessary and injudicious cuts, excisions and marks are made on carcasses during the meat inspection and care should be taken to avoid any unnecessary soiling, contamination or mutilation.

4.12 Carcass washing

- ❖ Carcass re-trimming should be done after inspection if there is still a need of removing any remnants of stick wounds, any residual pieces of hide, blood clots, bruised tissue and contamination before washing.

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- ❖ All carcasses should be washed to remove blood.
- ❖ Carcass washing should be done from top to down wards with a flow rate of 10 liters per minute for about 30-60 seconds.
- ❖ After washing, carcasses should be allowed to stay in the slaughter floor for about 30 minutes until the water is dripped out of the carcass so that stamping can easily be done.

4.13 Marking and branding

- ❖ All carcasses after being approved at inspection and as soon as the carcass is dry enough to hold the ink, should be legibly branded with the official inspection legend (Inspected and passed) with four stamps per side (in neck, thoracic, abdominal and hind quarter areas) and one stamp on each of the left and right peritoneum (a total of 10 stamps per carcass).
- ❖ Brands are to be applied by the meat inspector or by other person under his supervision.
- ❖ No person should place a stamp of approval on, or remove such mark from any carcass except under the supervision of the meat inspector.
- ❖ The stamp of approval should be kept and used under control of a meat inspector;
- ❖ Stamps and roller marking equipment should be kept hygienically, away from the floor and other dirty surfaces and be cleaned and sterilized regularly during use.

4.14 Edible offal handling operations

- ❖ Red offal should be washed with clean running water, hung on hooks.
- ❖ Rough offal should be removed from the dressing room where paunches and intestines should be separated and emptied of its contents; washed with clean running water; and hung on hooks for drip drying.

4.15 Condemned and inedible products handling

- ❖ The condemned materials should be treated by the veterinarian to make them obviously unfit for human meat (by sight, smell, or taste by adding certain chemicals such as powdered charcoal, kerosene etc.

- ❖ When a carcass is condemned, the meat inspector should put a "*Condemned*" mark on its outer surface.
- ❖ Under no circumstance should the skinning, evisceration and other preparation of animals condemned on ante mortem inspection, or found dead carcasses, be allowed on the slaughter floor.
- ❖ Livestock owners can salvage certain condemned meat products, which may be unfit for human consumption but be safe for pet animals, with the consent of the meat inspector after denaturing the products by adding charcoal or another denaturing agent should to the meat product to clearly distinguish such pet animal meat products from those prepared and approved for human consumption.

4.16 Non-condemned inedible meat products handling

Inedible meat products include those meat products which are not condemned but are not edible due to their nature (such as lungs, spleen, uterus, ovaries, udder and others). Inedible meat products should be treated by the inspector to make them obviously unfit for human consumption (by sight, smell, or taste).

4.17 Dispatching and meat transport

The meat inspectors should ensure that the meat and meat products are delivered to the customer or retailer in unaltered in manner that will not affect their fitness for human consumption. They have to ensure that the meat and meat products are dispatched directly from the abattoir in the following manner:

- ❖ Meat approved for human consumption should be transported from the abattoir to the retail shops by using dedicated meat transport vehicles
- ❖ Meat should not be placed in any form of transport vehicle that has not been cleaned and sanitized before loading.
- ❖ Vehicles should have an overhead rail for carcass transport.
- ❖ For the transportation of carcass meat, whether in whole carcass sides, quarters or boned cut meat, rails and shelves shall be used and constructed as follows:
 - the hooks on the rail shall be of such a construction as to prevent the meat from falling down during transportation;

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- minimum rail spacing for hindquarters and boned cut meat shall be 40 centimetres and for forequarters 35 centimetres;
- minimum space between rails shall be 60 centimetres;
- ❖ While on transport, meat should not come in to contact with the floor.
- ❖ the meat may be transported in non-insulated vehicles provided that they are fitted with sub-protection in the form of a double roof, the components of which shall be not less than 4 centimeters apart. Carriers of this type shall be fitted with a roof-top rotating ventilator and air outlets to provide for adequate ventilation
- ❖ Where human labor is required for loading and unloading of carcasses during transportation, personnel should be healthy and neatly dressed with proper protective clothing
- ❖ No person shall be allowed to stay in the compartment where meat is kept during transport.
- ❖ The engine of a carrier shall not be allowed to run whilst loading or un-loading is in process and all doors and lids shall be securely closed before the engine is started.
- ❖ Fueling of carriers shall not take place whilst the doors or the lids of a carrier are open.
- ❖ Vehicles used for the transport of meat and edible products should be used exclusively for this purpose and should be clean at the point of loading.
- ❖ Ensure any equipment or surfaces that contact meat products are made of nontoxic, noncorrosive materials that can be effectively cleaned.
- ❖ Vehicles internal surfaces including the floor should be light colored that allows visible contamination to be seen easily, impervious, corrosion resistant, non-toxic and made of a durable material that can be sanitized easily.
- ❖ Vehicles floor to wall and wall to wall junctions should be rounded.
- ❖ Rough offal should not be loaded in the same loading space as carcasses, portions or red offal, unless such rough offal is kept in clean, waterproof containers.

References

1. FAO (1991): Guidelines for slaughtering, meat cutting and further processing. FAO Animal Production and Health Paper 91.
2. FAO (2004). Good Practices for the Meat Industry, Food and Agriculture Organization of the United Nations, Rome, Italy.
3. FAO/WHO (2004): Draft code of hygienic practice for meat. In Report of the 10th Session of the Codex Committee on Meat Hygiene.
4. FSA, 2017. Personal Hygiene, Meat Industry Guide, Food Safety Authority, UK
5. MoARD, 2007. Meat Inspectors and Inspector Veterinarians Guide to Regulate Export Abattoir Operations, Ministry of Agriculture and Rural Development, Ethiopia
6. National Council for Law Reporting (2012): Meat control act chapter 356, Kenya.
7. NDA (2000): The slaughter and dressing process. In Meat inspectors' manual: red meat. National Department of Agriculture, South Africa,
8. NZFSA (2002): Industry standard 5: slaughter and dressing. New Zealand Food Safety Authority.
9. OIE (2018): Trade measures, import/export procedures and veterinary certification, section 5. Terrestrial Animal Health Code.
10. OIE (2021): Animal welfare, Terrestrial Animal Health Code, Section 7.

Annex I. Dressing procedures for red meat species

1. General

No dressing procedure shall begin if there is any potential return to or signs of, a return to consciousness. Carcasses should be dressed after being suspended by the hind legs. Procedures, including sticking and bleeding, are conducted in a hygienic manner with measures to avoid contamination, including, but not limited to:

- ❖ ensuring that instruments/equipment are clean, and sanitized as necessary
- ❖ ensuring the carcass does not contact other carcasses before inspector veterinarian's approval
- ❖ ensuring bleeding does not happen in dry landing area and that blood is contained to a specific area
- ❖ avoiding having the carcass contacted with splashing from the floor or unhygienic structures
- ❖ avoiding letting the carcass contact the floor or unhygienic structures
- ❖ avoiding the transfer of heads over unprotected edible meat products unless effective controls (e.g. trays, pans) are in place to protect from cross-contamination
- ❖ ensuring skin and hide is cut from inside-out
- ❖ ensuring defects that may contaminate a piece of equipment will be removed prior to a procedure

Zero tolerance for contamination requires that any fecal, ingesta or milk contamination that occurs during dressing be removed, by trimming prior to the final carcass wash. Equipment should be cleaned and sanitized if it comes into contact with contamination (or parts that by nature can be considered contaminated/inedible), pathological defects or any biological hazards. Particular care in this matter should be taken for the following:

- ❖ sticking knives
- ❖ knives for splitting the brisket or opening the abdomen
- ❖ gutting presentation equipment (e.g. hooks, trays, tables)

Dedicated equipment/tools may be necessary (e.g. boots and apron for workers on moving table top). Cleaning and sanitizing protocols should also reflect the microbial risk associated with organic build up.

Once the carcass has been approved, any residual bone dust and blood should be removed prior to refrigeration, a final inside and outside carcass wash being the recommended means to achieve this.

2. Specific dressing procedures

2.1 Cattle dressing

- ❖ The lactating mammary glands and the mammary lymph nodes are removed.
- ❖ The penis and the prepuce are removed.
- ❖ The feet are removed prior to skinning the carcass: skin the area above and below where the leg will be cut.
- ❖ Head is removed, but if it is skinned and be left on the carcass, the horns are removed, as applicable, avoiding the opening of the skull.
- ❖ The hide is removed, proceeding from shackle downward and reflecting away from the carcass.
- ❖ The brisket and midline of the abdomen are opened after contamination has removed along the incision line.
- ❖ The bung (rectum) is dropped by performing a circular cut around anus, followed by ligation (by tie or clip) of the rectum and neck of bladder and then inserting into a plastic bag for dropping into pelvic cavity.
- ❖ The skinned head is removed (if not already removed before skinning); the head is thoroughly washed, including nasal and oral cavities, prior to any cuts.
- ❖ The tongue is dropped and palatine tonsils are removed to expose retro-pharyngeal lymph nodes.
- ❖ The oesophagus is separated from trachea and surrounding tissues (e.g. rodding) and tied-off before evisceration.
- ❖ The carcass is eviscerated.
- ❖ The carcass is split, except in the case of calves, after any contamination has been removed along the split line.
- ❖ The spinal cord is completely removed from carcasses of Over Thirty Months cattle before the final carcass wash.

2.2 Ovine and caprine dressing

- The lactating mammary glands and the mammary lymph nodes are removed.

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- The penis and the prepuce are removed.
- The feet are removed prior to skinning the carcass: skin the area above and below where the leg will be cut.
- Head is removed, but if it is skinned and be left on the carcass, the horns are removed, as applicable, avoiding the opening of the skull.
- The skin is removed, proceeding from shackle downward and reflecting away from the carcass.
- The brisket and midline of the abdomen are opened after contamination has been removed along the incision line.
- The bung (rectum) is dropped by performing a circular cut around anus, followed by a step to mitigate any leaking from the rectum (such as tying off, use of a clip, intussusception, plugging) before dropping into pelvic cavity.
- The skinned head is removed (if not already removed before skinning); the head is thoroughly washed, including nasal and oral cavities, prior to any cuts.
- The tongue is dropped and the palatine tonsils are removed to expose retro-pharyngeal lymph nodes.
- The oesophagus is separated from trachea and surrounding tissues (e.g. rodding) and is tied-off before evisceration.
- The carcass is eviscerated