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First revision

ENQUIRY DRAFT

Specification for an Abattoir/Slaughterhouse

Guyana National Bureau of Standards

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Foreword

This Guyana Standard is the first revision of **GYS 260: 2004 "Specification for an abattoir."** This standard was revised by the Guyana National Bureau of Standards through the **Technical Committee – Livestock (TC 2)** and approved by the National Standards Council.

In the revision process, assistance was derived from the Indian Standard **IS 4393: 2016 (Reaffirmed 2022), "(Second revision), Basic requirements for an Abattoir"** and **IS 1982: 2015 (Reaffirmed 2020), (Second revision, Code of Practice for ante-mortem and post-mortem inspection of meat animals".**

The revision was deemed necessary to update the requirements for applicability in the current market to current food safety and hygiene practices. It will help in improving the present conditions of abattoirs and in guiding the construction of new abattoirs on modern lines specially with a view of having greater utilization of slaughterhouse by products.

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Specification for an Abattoir

1 Scope

This standard specifies the typical layout plan, hygienic and sanitary, requirements along with basic requirements for an abattoir for carrying out slaughter of cattle, sheep, goats, pigs and other animal species used for human consumption.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IS 1982: 2015 (Reaffirmed 2020) , *Ante-Mortem and Post-Mortem Inspection of Meat Animals – Code of Practice*

IS 4393: 2016 (Reaffirmed 2022), *Basic Requirements for an Abattoir*

3 Definitions

For the purpose of the standard the following definitions shall apply:

3.1 abattoir/slaughter house
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

3.2 approved for human consumption
The meat and offals have been inspected and passed without any restrictions and branded accordingly.

3.3 antemortem inspection
Any procedure or test conducted by a competent person on live animals for the purpose of judgement of safety and suitability and disposition.

3.4 carcass
The body of one of the following: sheep, goats, pigs, or cattle, that has been slaughtered, after bleeding, evisceration and removal of head, extremities of the limbs at the carpus and tarsus, the tail and udder and with the exception of pigs, removal of skin.

3.5 competent authority
the relevant agencies designated by law.

3.6 condemned
A slaughtered animal or meat that has been inspected and judged as unfit for human consumption and branded accordingly.

3.7 domestic
This is referring to animals within the home or country.

3.8 dressing

The removal of the inedible portions from the internal organs and carcass.

3.9 fat trap
A device for separating and retaining waterborne greases and grease complexes prior to the exit of the wastewater from the trap and the entry of such wastewater into the sanitary sewer system.

3.10 flaying
The act of skinning the animal and dressing the carcass.

3.11 fractious
Nervousness or erratic behaviour in animals.

3.12 knocking
A method in which a knocking or striking hammer is wielded on the head of the animal is now disallowed in humane practices in some countries, but in extreme and needy cases the hammer can be used to stun small ruminants by a quick blow at the back of the neck.

3.12 laboratory
A room or building fitted for tests.

3.13 lairage
An area where animals are kept before being slaughtered.

3.14 meat
The edible part of any animal slaughtered in an abattoir.

3.15 meat inspector
A trained officer appointed by the competent authority to conduct postmortem inspections of the animals

3.16 offal
May be edible or inedible parts other than carcass and may include head, brain, tongue, thymus, salivary glands, heart, lungs, liver, kidneys, bladder, stomach, intestines, spleen, pancreas, lymphatic glands, reproductive organs, udder, blood, tail, metacarpus, phalanges, heels, skin, and trimmings from the carcass.

(a) **Edible offal:** Parts and organs other than meat which may be passed fit for human consumption after animals are slaughtered.

(b) **Inedible offal:** Parts and organs which should not be consumed by humans.

3.17 potable water
Water that is pure and wholesome at the point of usage in accordance with the most recent World Health Organisation (WHO) standards for drinking water.

3.17 postmortem
Any procedure or test conducted by a competent person on all relevant parts of slaughtered/killed animals for the purpose of judgement of safety and suitability and disposition.

3.18 protective clothing
Special garments intended to prevent the contamination of meat and used as outer wear by persons in the abattoir or establishment and includes heading covering and footwear.

3.19 slaughter
Killing and bleeding of an animal for the purpose of human consumption.

3.20 slaughter area
The actual place within the abattoir where the animals are slaughtered.

3.21 soak away
A generic term often used to describe anything which takes the wastewater from a septic tank or sewage treatment plant.

4 General requirements

4.1 Location

Abattoirs shall be located in suitable areas, a city or town, from commercial buildings (such as schools, churches and airports) and in areas not designated for trade. The abattoir shall confirm to existing laws, be easily accessible to patrons and do not adversely affect the transport of meat to the marketplace. Main services, such as potable water, electricity and hygienic sewage disposal facilities, shall be provided.

4.2 Layout plan

4.2.1 Abattoirs shall have facilities for:

(a) resting animals before slaughter;
(b) ante-mortem inspection;
(c) carrying out humane slaughter;
(d) flaying, dressing and washing of the carcasses;
(e) hanging carcasses and edible offal;
(f) handling by-products;
(g) post-mortem inspection and disposal of meat unfit for human consumption;
(h) laboratory examination if applicable;
(i) staff amenities;
(j) segregation of sick or diseased animals; and
(k) adequate water supply.

NOTE 1: In addition, the facility may have a rendering plant or an incinerator for the disposal of waste, which shall be disposed of in a manner as stipulated by regulatory requirements

4.2.2 Abattoirs shall have adequate separation between clean and unclean sections. These shall be arranged in such a way from the introduction of a live animal into the abattoir up to the emergence of meat and offal classified as fit for human consumption; there shall be a continuous process, without any possibility of reversal, inter-section or overlapping between live animals and meat, and between meat and by-products or waste.

4.3 Units in an abattoir

4.3.1 Abattoirs shall have the following units:

(a) reception area or resting grounds;

(b) lairages;

(c) slaughter halls;

(d) ancillary accommodation; and

(e) refrigerated room.

4.3.1.1 Reception area or resting grounds

The abattoir shall have a reception area or resting ground of adequate size, where animals are subjected to veterinary inspection before moving to the lairage for 24 hours of resting. The area shall have the following facilities: ramp, watering and examination area, isolation pens and holding area.

Unless all animals are arriving on hoof, proper ramps for direct unloading of animals from trucks shall be provided. The ramps shall lead to the ante-mortem area with office room for the meat inspector. The animals shall be given water and examined before sending to holding pens.

Separate isolation pens shall be provided with watering and feeding arrangements for animals suspected to be suffering from contagious and infectious diseases; and fractious animals, in order to segregate them from the remaining animals.

Adequate holding area shall be provided according to the class of animals to be slaughtered. The holding area shall have water and feeding facilities, and overhead protective shelters.

4.3.1.2 Lairages

The lairage shall be of adequate size for the number of animals to be laired. The space in pens should be at least 2.8 m^2 per large animal and 1.6 m^2 per small animal. Animals shall be kept separately depending upon their type and class. The lairage shall be constructed to protect the animals from heat, cold and rain, and have adequate facilities for watering and ante-mortem inspection as given in **4.3.1.1**.

Where separate lairages or sections are to be provided for animals meant for halal or Jewish slaughter, complete visual separation shall be effected and entrances shall be far apart as possible.

4.3.1.3 Slaughter halls

Separate provisions, shall be made in an abattoir for the slaughtering, dressing and processing of animals as mentioned in **4.3.1.2**.

The slaughter halls and ancillary accommodation provided shall be separated, by solid walls depending upon the site. Exits to such sections shall be far apart as possible.

Separate space shall be provided for stunning (whether applicable), bleeding and dressing of the carcasses. The curbing should be at least 15 cm high and 10 cm with the top sloped 45 ^{o}.

Stunning section shall be so planned as to suit the animal and particularly the ritual slaughter, if any. Provisions shall be made for emergency slaughtering, for example injured animals. An animal shall not be slaughtered in sight of other animals. The stunning section associated with it shall be so built that escape from this section can be easily carried out by an operator without allowing the animal to pass the escape barrier.

This shall be accomplished by an arrangement such as placing vertical pipes at least 15 cm in diameter, 1.5 m high on prepared vertical pipe inserts, 12 cm high or the internal diameter of the pipe used for the vertical placed at least 50 cm apart.

A curbed-in bleeding area of adequate size shall be provided. It shall be so located that the blood shall not be splashed on other animals being slaughtered or on the carcass being skinned. Blood drainage and

collection shall be immediate and proper. A floor was point shall be provided for intermitted cleaning. Also, a hand-wash basin and knife steriliser shall be provided for the sticker to sterilize knife and wash his/her hands periodically.

Dressing of carcasses shall not be done on floor. Adequate means and tools for dehiding or belting of the animals shall be provided. Means for immediate disposal of hides or skins shall be provided. Hides or skins shall be immediately transported either in a closed wheeled container or by a chute provided with self-closing door. In no case, the hides or skins shall be spread on slaughter floor for inspection. Floor wash point and adequate number of hand wash basins with steriliser shall be provided in this section. Means for immediate disposal of legs, horns, hooves, etc., shall be provided through spring loaded floor chutes or side wall doors or closed wheelbarrows. In case wheelbarrows or trucks are used, care shall be taken that at no point wheelbarrow or truck has to ply under the dressing rails and a clear passage is provided for movement of the trucks.

Adequate space and properly located facilities shall be provided for inspection of the viscera of the various types of animals slaughtered. This section shall have adequate facilities for hand washing, tool sterilization and floor washing, and equipment for immediate separation and disposal of condemned material. Adequate arrangements shall be made for identification, inspection and correlation of carcass, viscera and head.

A curbed and separately drained area or an area of sufficient size, sloped 3.3 cm per metre to a floor drain, where approved carcasses shall be washed with a continuous flow of potable water.

4.3.1.4 Ancillary accommodation

A separate room and handing space shall be provided for emptying and cleaning of stomachs and intestines. This room shall have a separate exit. Pluck and viscera cleaning and separating sections shall be divided into edible and inedible sections for further processing. These sections shall be separated from the slaughter floor, except for one or two connecting doorways provided with solid, self-closing doors, completely covering the opening.

Suitable and sufficient facilities shall be provided for the isolation of meat requiring further examination by the inspector in a suitable laboratory within the premises of the abattoir.

All condemned meat shall be placed away from the abattoir in a secure location.

Well located toilet rooms shall be provided in the abattoir building away from slaughter walls. A separate hall with lockers and shower facilities shall be provided. Adequate drinking water and washing facilities shall be provided at convenient locations. Adequate facilities for canteen and first-aid shall also be provided.

If a separate block for hide curing or skin drying is not provided in the abattoir, the hides or skins shall be stored in a separate room and removed daily by the licensees.

If rendering facilities are not provided, the condemned materials shall be denatured and held in watertight metal containers in a suitable inedible product room pending daily removal by contractors.

4.3.1.5 Refrigerated room

Hanging halls shall be air-conditioned andshould have a temperature of at least 10^0C. Two retaining compartments shall be constructed of rust-resistant wire gauge or expanded metal portion extending at least 7.5 cm above ground to ceiling for holding carcasses.

4.3.1.6 Rails for carcasses

Rails with hooks of rust-proof metal or mild steel shall be provided for hanging the carcasses and for plucks, permitting free circulation of air. The hooks shall be cleaned and sterilised according to the santisation schedule.

The height and length of the rails, provided for bleeding and dressing, shall be in accordance with **Table 1**.

The space required per carcass and the distance between the rails in hanging or chill room, shall be in accordance with **Table 2**.

Table 1
Guidelines for bleeding and dressing rails

Carcass	Height per carcass (m)	Length per carcass (m)
Bleeding rail for sheep, goats and pigs	* 3.00 - 2.20	0.45
Bleeding rail for large animals	4.50 - 5.00	0.60
Dressing rail for sheep, goats and pigs	2.00 - 2.20	0.90
Dressing rail for large animals	3.20	1.80 for legging, dehiding and 2.40 for evisceration and further processing.

* Falling at the rate of 1 cm per 1 m (for gravity rail).

Table 2

Minimum requirements/Guidelines for rails in hanging or chill room

Mass of carcass	Space per carcass (m)	Distance between rails (m)	Height of rails (m)
Sheep and goats	0.30 to 0.40	0.30 to 0.40	2.00 to 2.20 Minimum (Single changing)
Pigs:			
(a) less than 70 kg	0.30 to 0.40	0.30 to 0.40	2.00 to 2.20
(b) 70 kg and over	0.45 to 0.60	0.45 to 0.60	2.00 to 2.20
Large animals	0.45 to 0.60	0.80 to 1.00	3.20 (For halves) 2.20 to 2.20 (For quarters)

5 Civil construction

5.1 Approval of abattoir

The plan/layout shall be approved by the local authority. Subsequent approvals shall be sought from the other relevant authorities.

5.2 Ante-mortem and pen area

Brick, tile, smooth concrete or other impervious, waterproof materials are suitable for floors. In some areas wooden floors will suffice if they are tight, smooth, in good repair and properly maintained. Wooden floors are not suitable in areas where slaughtering or curing takes place and meat juices and moisture collect. Curbs of impervious material at least 15 to 30 cm high shall be provided around the borders of livestock pen area, except at the entrances. The pen shall be covered.

5.3 Plant building

Materials used shall be impervious, easily cleansed and resistant to wear and corrosion. Materials such as wood, plasterboard, and porous acoustic-type boards, which are absorbent and difficult to keep clean shall not be used in edible product sections.

5.3.1 Floors

Floors shall be non-toxic, non-absorbent and non-slippery with a suitable gradient for drainage.

5.3.2 Coves

Coves with radii sufficient to promote sanitation shall be installed at the juncture of floors and walls in all rooms and shall be at least 10 cm.

5.3.3 Interior walls

Interior walls shall be smooth and flat and constructed with impervious materials such as glazed brick, smooth surfaced suitable cement plaster, or other non-toxic, non-absorbent material applied to a suitable base. Walls shall be provided with sanitary type bumpers to prevent damage by hand- trucks and carcass shanks. The interior walls shall have washable surfaces of at least 3 m height or reaching the ceiling from the floor, so that splashes can be washed and disinfected.

5.3.4 Ceilings

Ceilings shall be at least 5 m in height in work rooms. It shall be constructed of suitable cement plaster, or other acceptable impervious material and finished to minimize condensation, mould development, flaking and accumulation of dirt. The walls (above glazed type portion) and ceilings shall be painted with food grade paint to maintain cleanliness.

5.3.5 Windows and windowledges

Window frames shall be made of a smooth impervious material, kept in good repair. Glass shall not be used.

Window ledges shall slope at 45^{o} to promote sanitation. To avoid damage to windows from impact of hand trucks and similar equipment, windowsills shall be at least 1.20 m above the floor level. Ventilation through mechanical venting or through working vents shall be provided in the roof structure.

5.3.6 Doorways and doors

Doorways through which product is transferred on rails or in hand trucks shall be at least 1.50 m wide. Doors shall be of rust resistant metal construction throughout, , they shall be clad on both sides with soldered or welded seams. Door jambs shall be clad with rust resistant metal securely affixed so as to

provide no crevices for dirt or vermin. The juncture at which the door joins the walls shall be effectively sealed with a flexible sealing compound.

5.3.7 Screens and insect control

All windows, doorways, and other openings that may admit flies shall be equipped with insect and rodent screens/plastic curtains. "Fly chaser" fans and ducts or air curtains/plastic curtains shall be provided over doorways on outside walls of food handling areas that are used for dispatch or receiving.

5.3.8 Rodent proofing

Solid masonry walls constructed of glazed brick, shall have, expanded metal or wire mesh, at least 1.30 mm, embedded in walls and floors at their junction. This mesh shall extend vertically and horizontally to a sufficient distance to exclude the entrance of rats and other rodents.

5.3.9 Stairs

Stairs in edible product handling sections shall be made of impervious materials with solid treads and closed risers and shall have side curbs of similar material at least 15 cm high measured at the front edge of the treads. Floor openings for chutes, etc. and for stairways except at entrances shall have curbs of impervious materials, such as concrete or metal, at least 30 cm high, to prevent floor drainage from entering such chutes.

5.3.10 Vehicular areas for trucks

Concrete paved areas, properly drained and extending at least 6 m from building loading docks or livestock platforms shall be provided at places where vehicles are loaded or unloaded.

Pressure washing jets and disinfection facilities for trucks carrying animals shall be provided.

5.4 Drainage

5.4.1 All parts of floors where wet operations are conducted shall be well drained. One drainage inlet shall be provided for each at least 37 m^2 of floor space. A slope of at least 20 mm per meter to drainage inlets shall be provided for usual conditions.

Floors shall slope uniformly to drains with no low spots which collect liquid. Floor drains shall not be provided in freezer rooms or dry storage areas. When floor drains are installed in rooms where the water seal in traps is likely to evaporate without replenishment, they shall be provided with suitable removable metal screw plugs.

Floors shall have "U" drains with covers that are fly and rodent proof.

Floor drainage valleys, at least 60 cm wide shall be used in dressing rails of pigs, calves, and sheep. These valleys shall slop at at least 1 cm per meter to drains.

Floor valleys shall be under the dressing rails of cattle slaughtering sections, unless the floor drainage is localised with drainage inlets placed beneath the dressing rails.

5.4.2 Traps and vents on drainage lines

Each floor drain, including blood drains, shall be equipped with a deep seal trap (I, U, or S shape). Drainage lines shall be properly vented to the outside air and be equipped with effective rodent screens.

5.4.3 Sanitary drainage lines

Drainage lines from toilets and urinals shall not be connected with other drainage lines within the plant and shall not discharge into a grease catch basin. Such lines shall be installed so that if leakage develops, it shall not affect the product or the equipment.

5.5 Lifting and ventilation

5.5.1 Unrefrigerated work rooms shall be provided with adequate direct natural light and ventilation or ample artificial light and ventilation by mechanical means or working vents. Uncoloured (non-glass material) having a high transmissibility of light shall be used in skylights and windows. The skylight/window shall be one-fourth the floor area of a workroom. This ratio shall be increased where there are obstructions, such as adjacent buildings, overhead catwalks and hoists, which interfere with the admittance of direct natural light. Well distributed artificial lighting of good quality shall be provided at places where adequate natural light is not available or is insufficient.

5.5.2 Abattoirs shall be constructed so that meat inspection is carried out in daylight. Sockets for the use of inspection lamps shall be provided at convenient places.

5.5.3 Abattoirs shall be provided with well distributed artificial light of an intensity of 200 lux throughout the slaughter hall and workrooms. Places where meat inspection are carried out, shall have an intensity of 500 lux artificial light. Lighting fixtures that come in contact with the product shall be encased with protective sheaths.

5.5.4 Abattoirs shall be provided with suitable and sufficient ventilation to the outside air. The construction of the slaughter hall shall be arranged that the dressed carcasses are not exposed to direct sunlight.

5.6 Supply of water

5.6.1 The water distribution plant shall be located at the load center. There must be adequate potable water supply.

Large animals shall be supplied with at least 1000 L water; small ruminants with at least 100 L water and pigs with at least 450 L water per animals.

5.6.2 A constant supply of clean hot water shall be provided in the slaughter area/hall and workrooms during working hours. The pressure shall be 200 to 330 kilopascals for the washing of carcasses. Equipment shall be sterilised frequently with hot water of 82^{o}C.

5.6.3 Floors in the slaughter and working departments of at least 37 m^{2} shall be washed with a water pressure of 1,000 to 17,000 kilopascals.

5.6.4 Knee and foot operated facilities for washing of hands (including adequate supplies of hot and cold running water, nail brushes and soap or other detergent) shall be provided for persons working in an abattoir. Hands shall be dried using paper towel or a blow dryer. Toilets shall be supplied with water by a flushing appliance.

5.6.5 Non-potable water used for fire control, etc. shall be carried in separate lines identified by colour and with no cross-connection or back siphonage with lines carrying potable water.

6 Equipment construction

Except for equipment such as utility boards, all other equipment shall be constructed either of rust-resisting metal such as stainless steel or galvanised metal with smoothness of high quality commercial hot dip. Galvanised metal shall not be used where corrosive action of food products and cleaning compounds are required. Plastic used shall be abrasion and heat resistant, shatter proof, nontoxic and shall not contain, constituents that affect the meat or meat products during contact. The following materials shall not be used in an abattoir:

(a) copper and its alloys in equipment used for edible products;
(b) cadmium in any form in equipment handling edible products;
(c) equipment with painted surface in product zone;
(d) enamel containers or equipment;
(e) lead; and
(f) wooden cutting surfaces and wooden handle equipment.

6.2 All bearings shall be located outside the product zone and if adjacent thereto, shall be constructed with a removable seal at the entrance of the shaft, into the product zone.

6.3 Interior corners of equipment shall be provided with a radius of 6 cm, except where greater radii are required to facilitate drainage and cleaning.

6.4 All welding within the product zone shall be continuous, smooth, even and flush with the adjacent surfaces.

6.5 All parts of the product zone shall be free of recesses, open seams and gaps, crevices, protruding ledges, inside threads, inside shoulders, inside bolts or rivets and deal ends.

6.6 For sanitary maintenance, equipment shall be constructed and installed so as to be completely self-draining.

6.7 Care shall be taken to prevent the contamination of product by lubricants used in overhead motors, gears, and similar devices. If drip pans are necessary, they shall easily be accessible for inspection and removable for cleaning.

6.8 All safety or gear guards shall be removable for cleaning and inspection.

6.9 All external surfaces that do not come into contact with food products shall be free of pen seams, gaps, crevices and inaccessible recesses.

6.10 for comfortable working for employees the worktable shall be at waist height of the worker to work in standing position. If the table is at a greater difference in height (that is 80 cm to 86 cm more) it shall have a platform incorporated for the height above 86 cm.

6.11 Work platform for "on-the-rail" operations shall be such height that the slaughter has neither to stoop too low nor stretch himself/herself to his/her operation zone, and he/she shall be able to reach the operation zone in his natural standing position.

6.12 Installation

6.12.1 Permanently mounted equipment shall be installed at least 60 cm away from walls and at least 60 cm above the floor to provide access for cleaning and inspection or sealed watertight to the floor area.

6.12.2 Wall-mounted cabinets and electrical connections (such as switch boxes, electrical control panels, and BX cables) shall be installed at least 25 cm from equipment or walls or shall be sealed to the equipment or walls.

6.12.3 Water-washing equipment, such as soaking and cooking vats, sausage stuffing tables, can sterilisers, and casing preparation equipment, shall be installed so that wastewater from each unit is delivered through an interrupted connection into the drainage system without flowing over the floor. Valves on drainage lines serving such equipment shall be easily cleanable and shall be mounted flush with the bottom of the equipment. Soaking and cooking vats shall be provided with overflow pipes 5 cm in diameter. The upper end of each overflow pipe shall be equipped with an open-end cleanout tee to facilitate cleaning.

6.12.4 Vent stacks from covered cooking vats or hoods over hook tanks shall be so arranged or constructed as to preclude drainage of condensate back into the vats.

6.12.5 All tables or other equipment having water on the working surface shall be provided with turned-up edges. The height of the turned-up edge depends on the volume of water used and the operations conducted. The turn-up shall be at least ≥ 2 cm.

7 Plant wastewater disposal

7.1 Abattoir wastewater, where applicable, shall be discharged into a municipal sewer system. In cases, where waste is discharged into a stream, it shall pass through a soak away and the flow of water shall be sufficient to carry the waste well away from the plant. The waste so discharged shall be treated and free of organic material such as fat, manure and any potential biological hazards. If a private septic tank or sewage disposal system is used, it shall be efficiently designed and operated so as not to produce objectionable conditions on or near the official premises. For the removal of grease and manure, catch basins and vibrating screens with hopper, respectively, shall be provided. The method used must comply with the requirements of the local by-laws.

7.2 Catch basin for grease recovery

7.2.1 Catch basin or fat trap for the recovery of grease shall not be placed in or near edible products department or area where edible products are unloaded from or loaded on to vehicles. To facilitate cleaning, such basins shall have inclined bottoms and be easily accessible for cleaning. They shall be so constructed that they shall be completely emptied of their contents for cleaning. A hose connection for furnishing hot water (not less than 82^0C) for cleaning purposes shall be provided at convenient locations near the basin.

7.2.2 The area surrounding an outside catch basin shall be paved with impervious material, such as concrete, and provided with suitable drainage facilities. Suitable facilities shall be provided for the transfer of grease to the point of disposal after it is skimmed from the basins by mechanical or other means.

NOTE 2: An alternative system for fat trap cleaning, having an equivalent effect can be provided, for example, a chemical degreaser.

7.3 Manure removal

7.3.1 A separate drain line for water containing manure shall be provide. This wastewater shall be pumped by wet pit or dry non-clog pumps and manure screened out and disposed of by mechanical or the other suitable means. Some consideration as in catch basin shall be given for the location of this plant.

8 Maintenance and sanitation of establishments, facilities, and equipment

8.1 Cleaning

8.1.1 It is important to implement procedures which are applicable to the processing area being cleaned taking into consideration the nature of contaminants, type of detergents and method of cleaning.

8.1.2 Nature of Contaminants

Most of the contaminants in an abattoir are fat or protein, lubricants, vermin, bone chips, manure, bristles, hair, skin, tissue, spilled chemicals.

8.1.3 Cleaning Techniques

Depending upon the requirement any of the following types of cleaning can be used:

(a) Manual cleaning;

(b) Mechanical cleaning;

(c) High pressure cleaning;

(d) Moist steam cleaning; and

(e) Foam cleaning.

8.1.4 Sanitation Measures

8.1.4.1 Dry Clean

Removing all pieces of meat, fat and other product residues.

8.1.4.2 Soaking

Small pieces/parts of equipment can be soaked in a tank of water and detergent. Large equipment, floor and walls can be foamed.

8.1.4.3 Physical Cleaning

After soaking, equipment is cleaned manually, using a brush or mechanically using high pressure or steam cleaning. Manual scouring to remove protein crusts and adhesive layers.

8.1.4.5 Rinsing

Thorough hose down with warm water to remove detergent residues, contamination.

8.1.4.6 Drying

Excess water should be removed from horizontal surfaces by wiping with paper towels or scraping with scrubbers.

8.1.4.7 Sanitation

Sanitizing agents may be applied as spray or mist, immediately after post cleaning rinse until next day's production.

8.1.4.8 Pre-operation Hose Down

This serves to remove sanitizer residues and to rinse off contamination.

8.1.4.9 Detergents

Any detergent formulation may contain 2 to 15 components which may belong to the following categories:

(a) Alkalis - caustic soda, caustic potash, carbonate, silicate, phosphate.

(b) Acids - phosphoric, nitric, citric, glycolic, sulphamic, hydrochloric.

(c) Chelating agents - EDTA, NTA, gluconate, glucoheptonate, citrate.

(d) Solvents - isopropanal, propylene glycol, butyl diglycol, ethers.

(e) Surfactants - anionic (Ammonium lauryl sulphate), Cationic (quartz-quaternary Ammonium compounds) non-ionic, amphoteric.

(f) Inhibitors - organic, (sodium benzoate). Inorganic, (sodium nitrite, sodium Chromate).

(g) Enzymes - protease, lipase, amylase.

(h) Oxidizing agents - hypochlorite, Isocyanurates, Dichlor, Stabilised Chlorine dioxide, hydrogen per oxide.

(i) Stabilizers - Cynuric acid.

(j) Viscosity modifiers.

8.1.4.10 Water to be used for cleaning and washing should be potable (see IS 10500). Water should be tested once a month for bacteriological requirements and once in six months for chemical requirements (see IS 10500). The slaughterhouse/abattoir in charge must keep meticulous records of the results of bacteriological and chemical tests.

8.1.4.11 Microbial standards for surfaces in contact with products are as follows:

(a) Thorough clean surfaces: Total viable count (TVC): less than 10/cm^2 Coliform count: 0
(b) Clean surfaces: Total viable count (TVC): less than 50/cm^2 Coliform count: 0
(c) Surface in use: Total viable count (TVC): less than 1 000/cm^2 Coliform count: 0

9 Safety requirements

There shall be adequate firefighting arrangements and portable first aid fire appliances shall be fixed in accordance with the Fire Prevention Act of 1954.

9.2 Meat handlers and workers

9.2.1 Person possessing a valid license or certificate by the municipality/corporation or local authority should be employed in an abattoir. The license should be renewed once in two years after medical examination of the person.

9.2.2 Persons below the age of 18 years and above 58 years should not be employed.

9.2.3 Person suffering from communicable infectious/ contagious diseases should not be employed either to slaughter or work in the abattoir.

9.2.4 Daily routine health checkup of all meat workers for cough/cold/fever/wounds should be done while entering the abattoir.

9.2.5 Wrist watches, gold/silver ornaments, flowers should not be worn, and mobile phones and perfume should not be used in the slaughter/processing area.

9.2.6 All meat workers, both male and female should cover their head and trim their nails and wear proper clothing, hand gloves and gum boots to ensure hygiene.

9.2.7 When returning from an illness, management must demand a medical certificate from that person indicating that they have no impediment to return to work. (This is to prevent such a person contaminating the product with pathogenic microorganisms.)

9.2.8 A person with an open cut or abrasion should not handle the product unless the cut is completely covered with a coloured, waterproof covering.

9.2.9 All personnel working in the abattoir should maintain their own personal cleanliness.

9.2.10 Protective clothing includes light- c o l o u r e d overalls or a coat and trousers, chain mail gloves and aprons (where applicable), footwear and hair/snood coverings.

9.2.11 All personal belongings and clothing should be stored in an area away from the abattoir, in designated lockers.

9.2.12 Smoking and eating and/or drinking are not permitted in the production area.

9.2.13 Hand washing should be conducted on entering and leaving the abattoir, immediately after finishing any task that involved contact with intestinal contents/faecal material on the carcasses and after using the toilet facilities.

9.2.14 The access of visitors should be controlled to prevent contamination.

9.2.15 All necessary precautions should be taken to prevent cross-contamination, including the use of protective clothing, hair covering and footwear by all visitors.

Appendix A

Normative

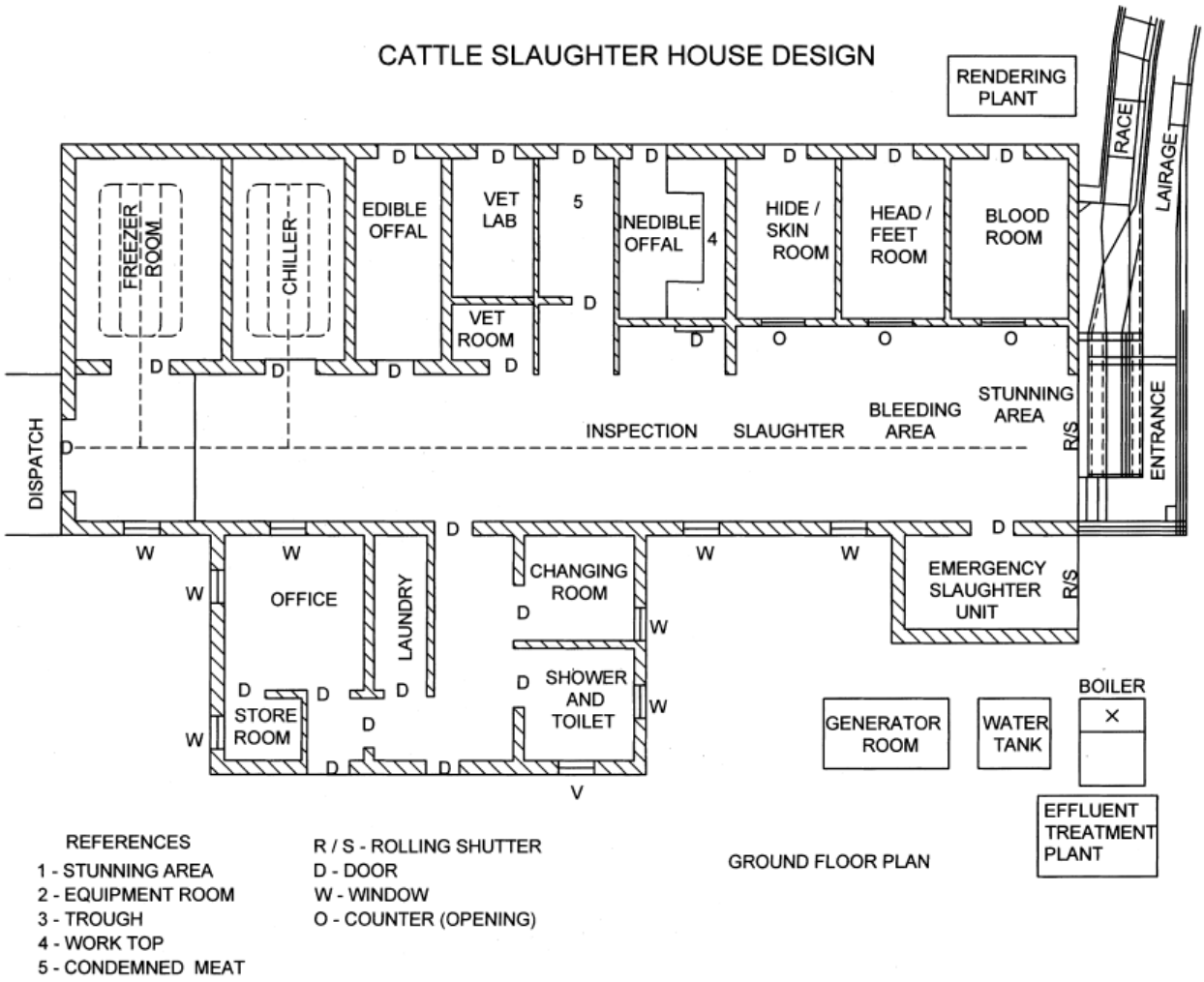
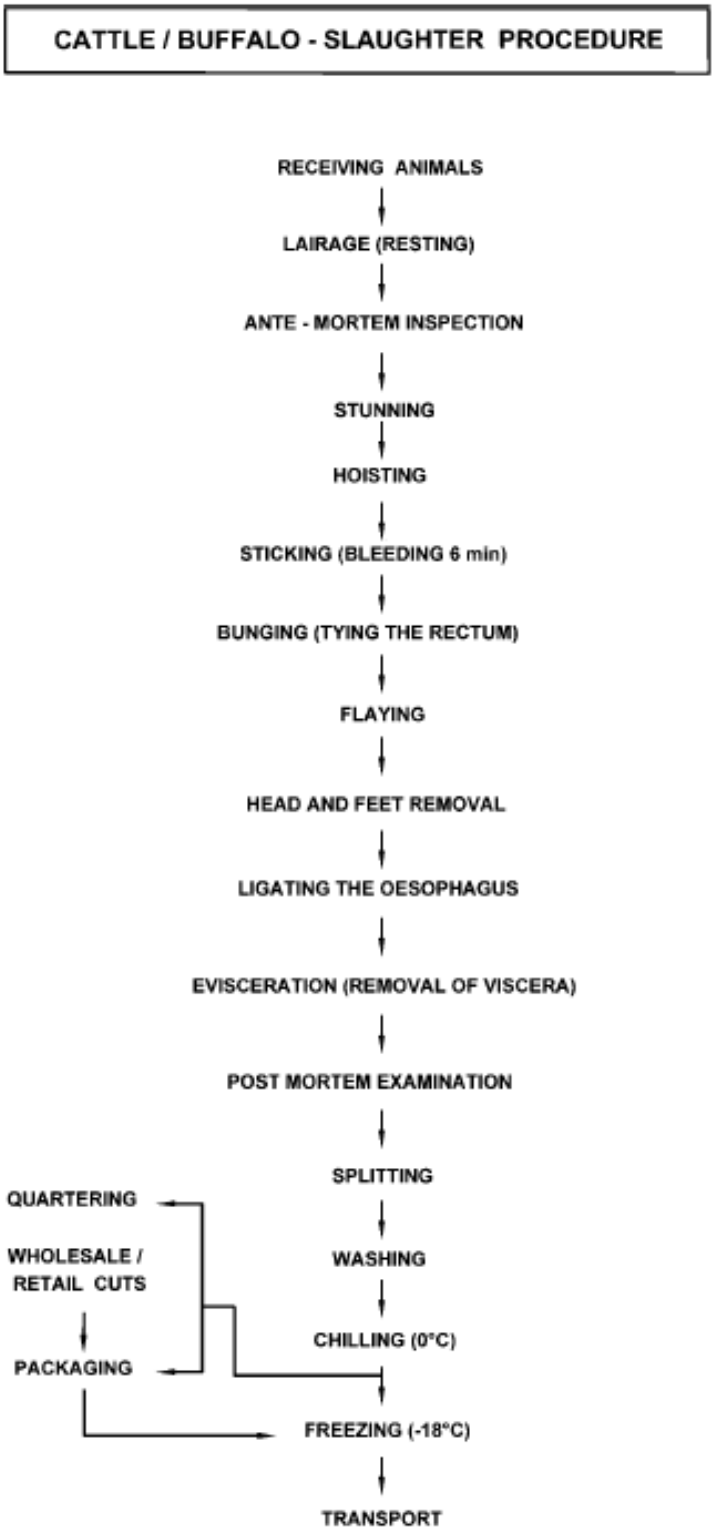


FIG. 1 TYPICAL LAYOUT PLAN FOR CATTLE ABATTOR

Appendix B

Normative



NOTE — In *Halal/Jhatka* method of slaughter, the facilities have to be provided for sticking the animals on the floor and hoist to over head rails.

FIG. 2 FLOW DIAGRAM FOR CATTLE ABATTOIR

Appendix C

Normative

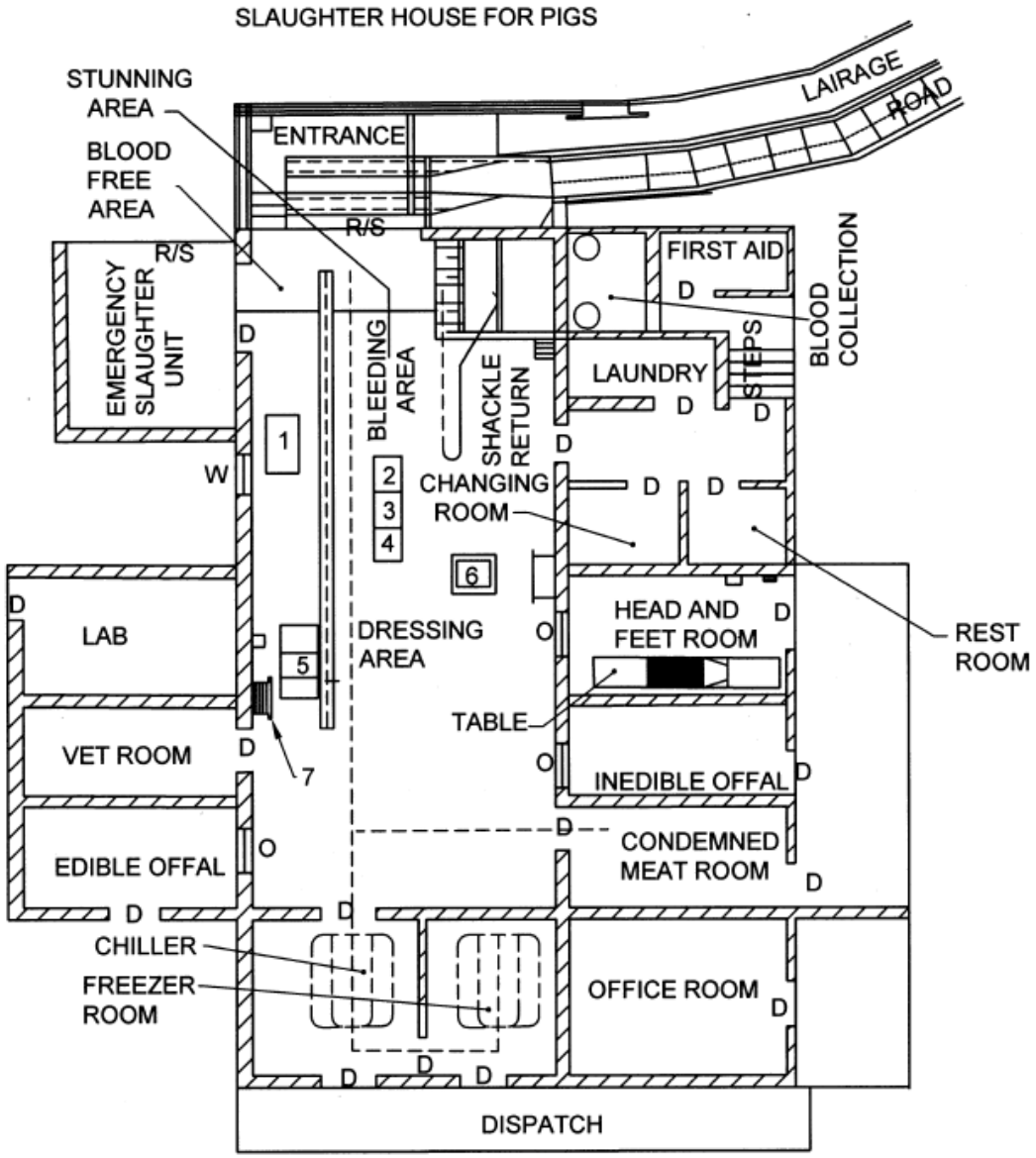


FIG. 3 TYPICAL LAYOUT PLAN FOR PIG ABATTOIR

Appendix D

Normative

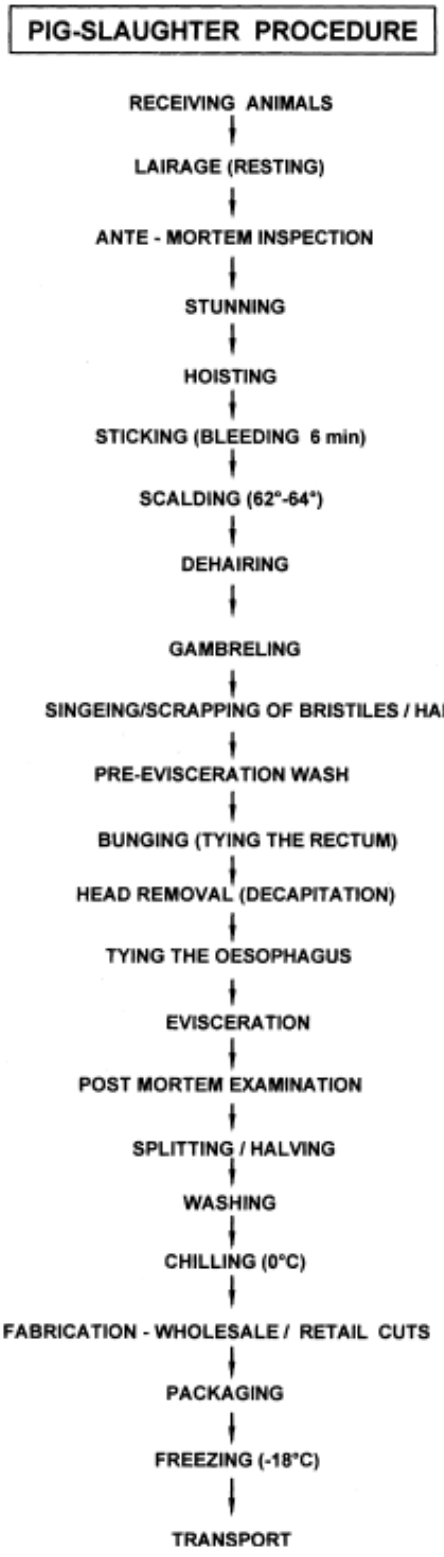


FIG. 4 FLOW DIAGRAM OF STANDARD PIG SLAUGHTER OPERATIONS

Appendix E

Normative

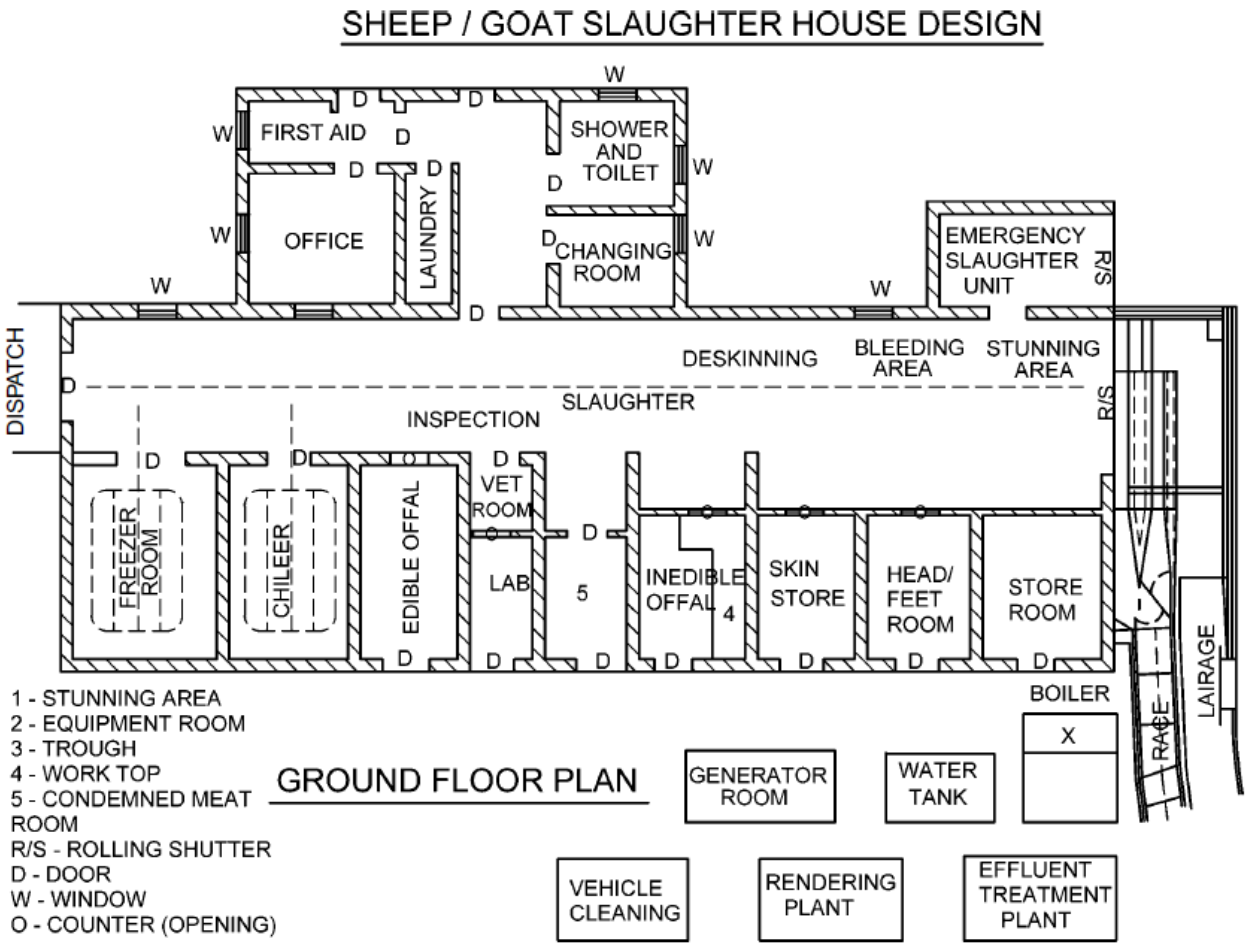
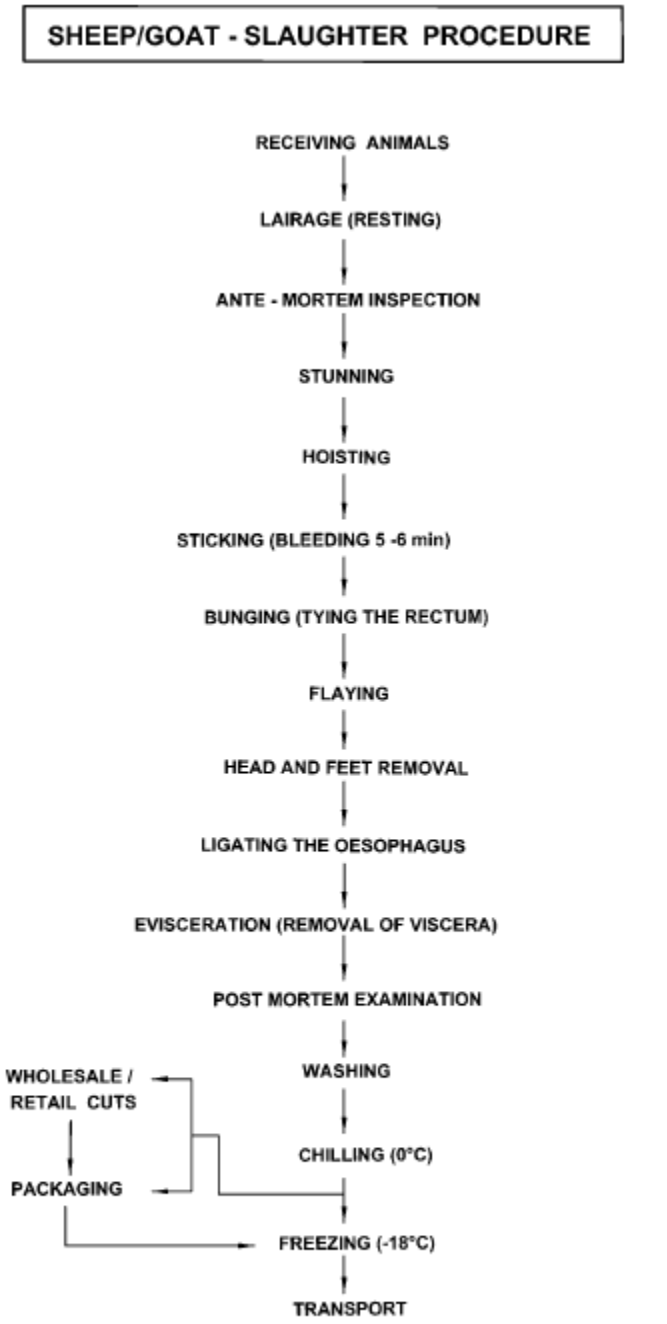


FIG. 5 TYPICAL LAYOUT PLAN FOR GOAT AND SHEEP ABATTOIR

Appendix F
Normative



NOTE — In *Halal/Jhatka* method of slaughter, the facilities have to be provided for sticking the animals on the floor and hoist to over head rails.

FIG. 6 FLOW DIAGRAM FOR GOAT AND SHEEP ABATTOIR

Appendix G

Normative

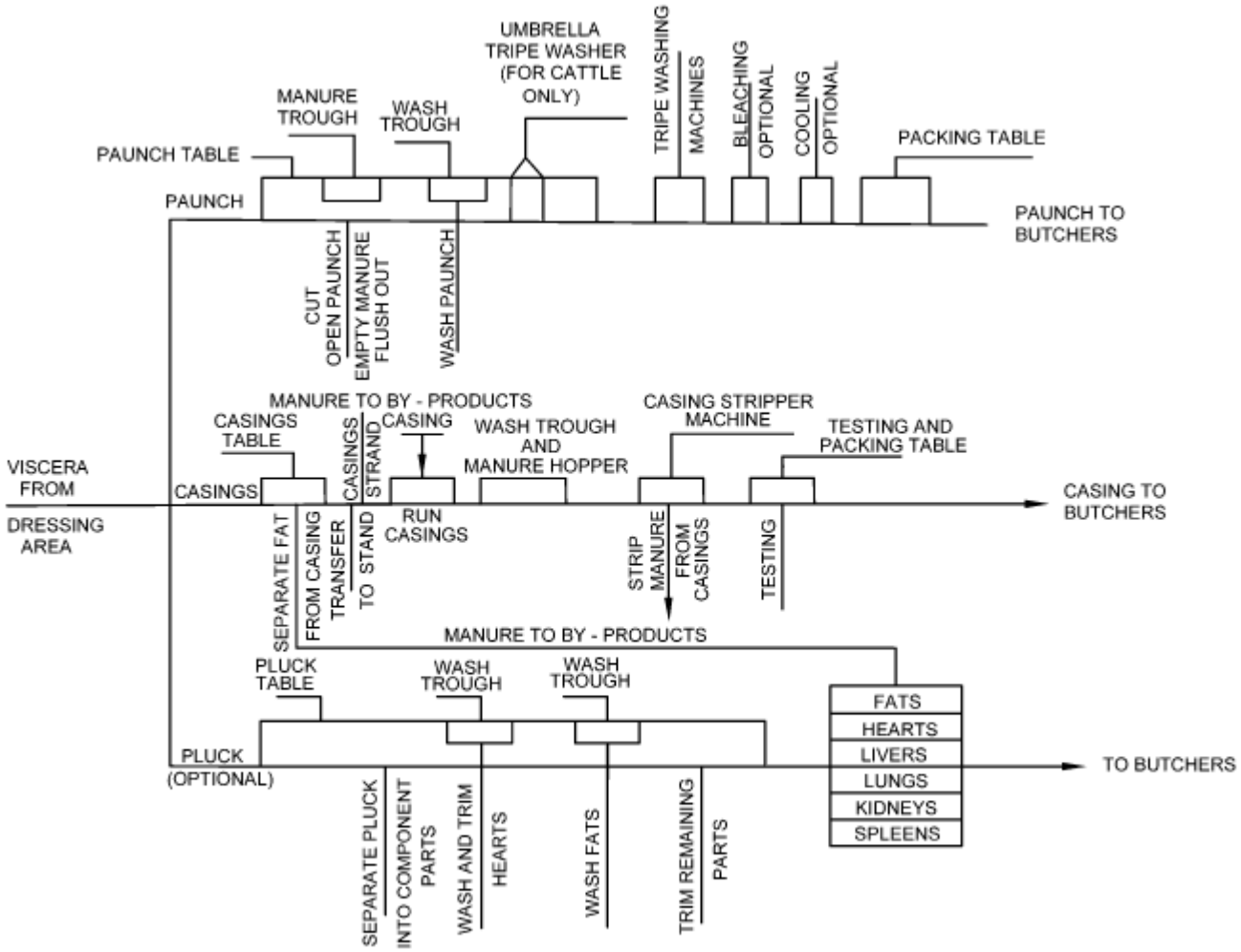


FIG. 7 CATTLE, PIG AND GOAT OFFALS FLOW DIAGRAM

Appendix H

Normative

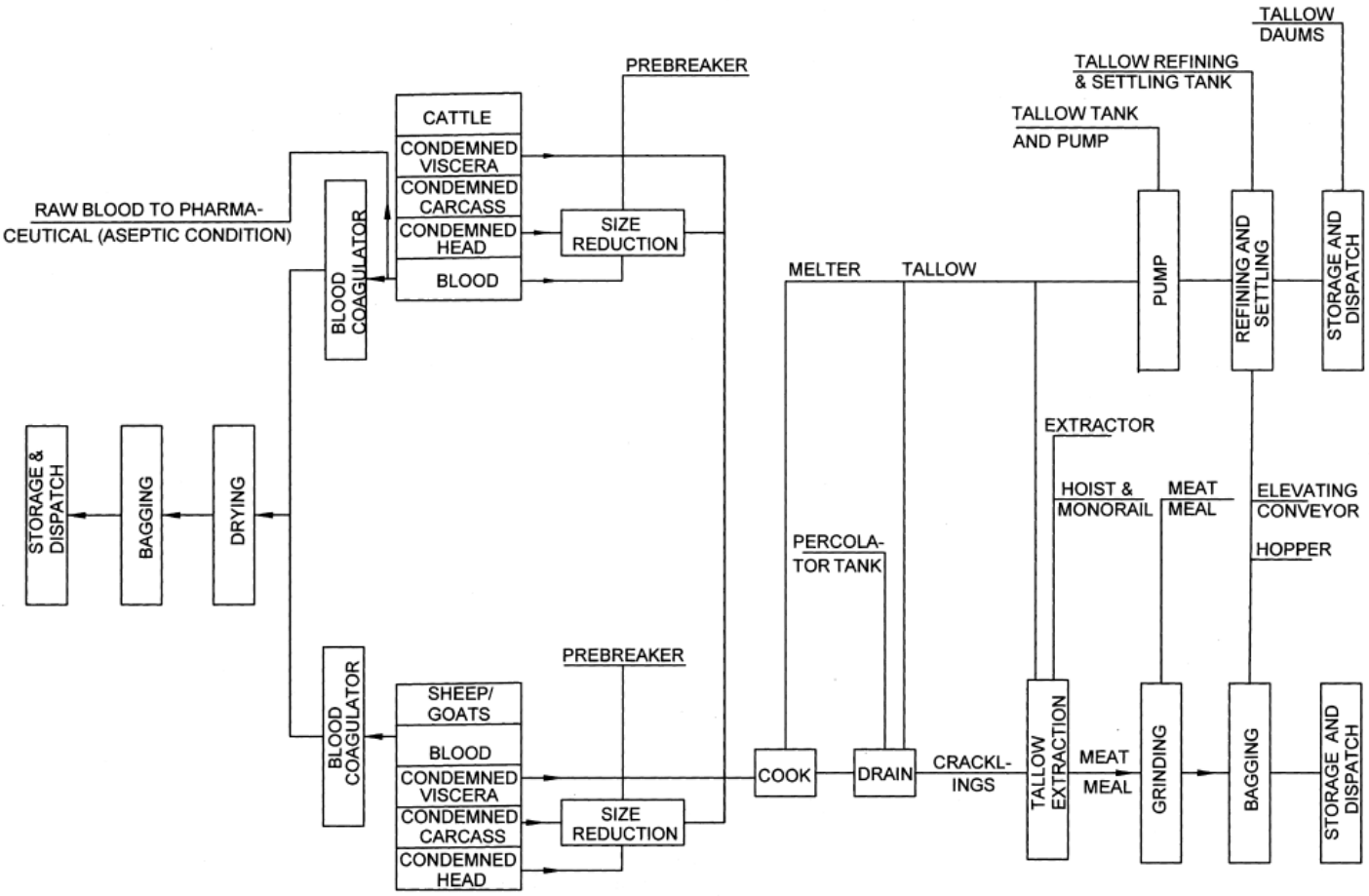


FIG. 8 BY-PRODUCTS (RENDERING) FLOW DIAGRAM

Appendix I

Normative

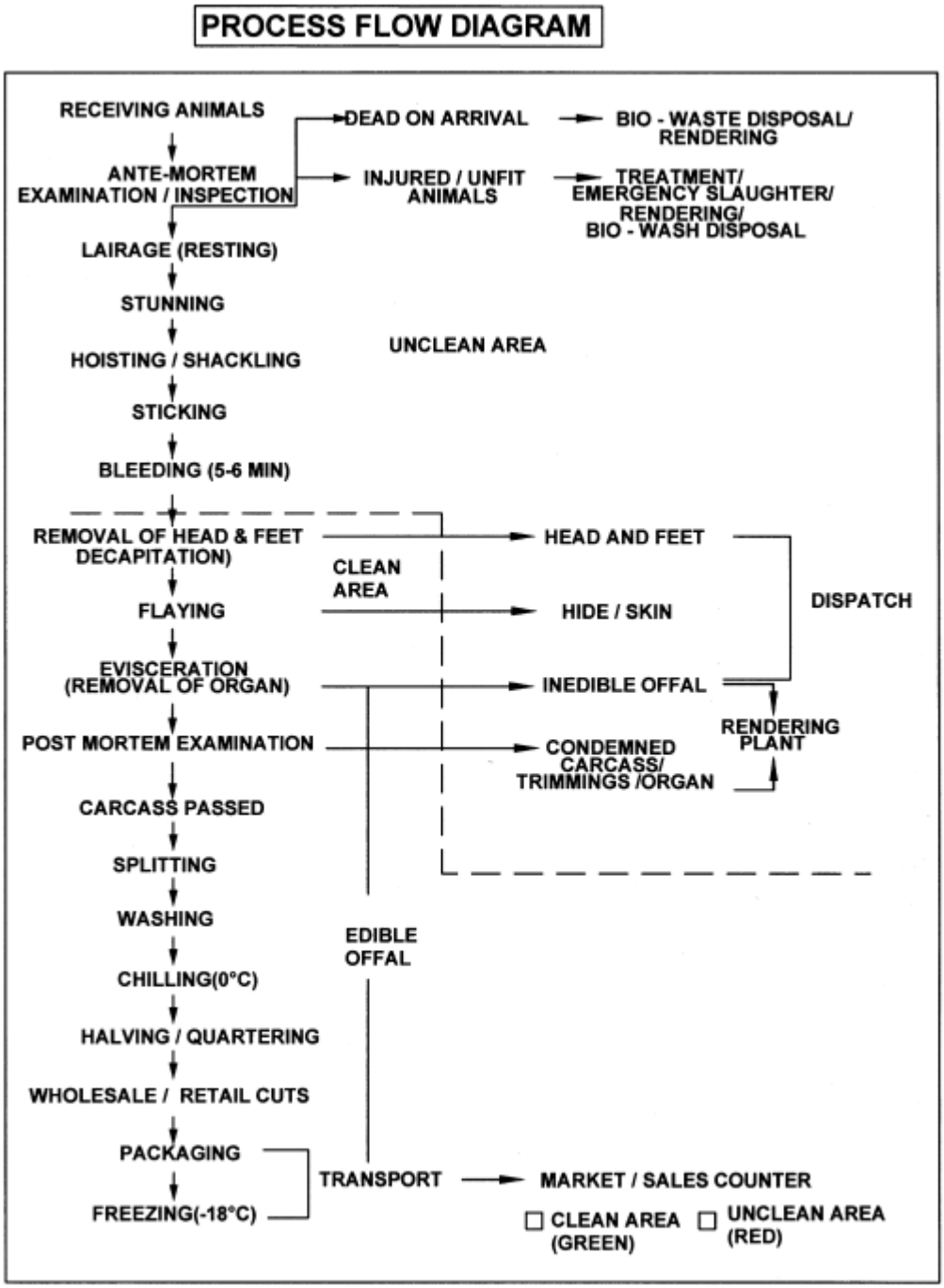


FIG. 9 GENERAL PROCESS FLOW DIAGRAM

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