

INFRASTRUCTURE





Meat Processing Toolkit



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Infrastructure and processing site layout

When setting up a slaughtering house it is essential that the condition of the building - the materials of construction and its position - are all suitable for food production. The plant should not be located near swamps, ditches or refuse dumps where insects and rodents are likely to be found. The site should allow waste water to drain away freely and have suitable facilities to dispose of waste food and rubbish. A supply of clean water is essential.

Physical layout
Basic services
Equipment
Physical layout

Ideally the operational areas of the slaughtering house should be at ground level, with the raw ingredients entering at one end and the finished goods leaving at the other.

The different operations should be kept separate from each other to prevent contamination. For example, perishable raw materials should be kept separate from non-perishable ones.

Packaging materials should be stored separately from the food items.

If possible, toilets should be located outside the processing building. If they are in the main building, there should be two doors between the processing room and the toilet.

Workers must have access to handwashing facilities with soap and clean towels.

The building should be constructed with smooth walls. The joint between the wall and floor should be rounded for easy cleaning. The building lines should be simple and square, without crevices and small places that can attract dust and may become birds nests. Windows should be covered with mosquito mesh to prevent the entry of flies and other insects.

The floor should be made of good quality concrete and should slope to a central drainage channel so that at the end of the day the whole area can be hosed down.

The drainage channel should be fitted with a heavy iron grating that can easily be removed for cleaning. The outlet of the drain should be covered with wire mesh to prevent rodents entering.

The ceiling and walls must be made from washable and easily dried materials. They must not be absorbent or porous.

The lighting should be natural if possible. If artificial lights are used they must not get in the way of the processing. The bulbs should be protected to prevent glass falling into the products if the lights are broken.

It is important to have good ventilation, especially where heating takes place. Large window openings should be covered with mesh to allow air and natural light into the building, while preventing insects and birds.

Basic Services

Three basic services are required for a basic food processing operation:

Electrical power

It is preferable to have access to electricity for lighting and for the operation of machinery. The electricity points should be situated high up the walls and away from water supplies so that they do not get wet during hosing down of the building.

Drinking water

Drinking water should be available in sufficient quantities to allow for the safe, hygienic processing of food. Water must be protected from all possible sources of contamination. The storage tank must be covered. Clean water is often a scarce commodity and therefore efforts should be made to conserve it. Clean water must be available at all times. It is recommended that an elevated storage tank is used that is not reliant on the use of electricity. The use of a storage tank allows the water to be treated with a disinfectant. It is recommended that chlorine is added to water as a disinfectant. The recommended dosage is 2 ppm of free chlorine, which is equivalent to 100ml sodium hypochlorite solution per 2000 litres of water. At this level, the chlorine disinfects, but does not affect the taste of the water.

Disposal of waste water and material

Provision should be made for the disposal of waste water and waste material

Basic facilities

A small to medium scale fruit and vegetable processing unit must have the following basic facilities:

Reception of raw material

The plant must have a special area for the reception and storage of raw material until it is required. This area may simply be a shed or an appropriately designed room. The area should be clean, away from direct sunlight and with control over the temperature and humidity according to the type of material being stored. Care should be taken to ensure that rodents, birds and insects cannot get into the store building. The raw material storage area should not be used for the storage of other products that could contaminate it such as cleaning materials and pesticides. The quality of the finished product is directly dependent on the quality of the raw material. Thus the conditions of the storage area are of great importance. This storage area should have basic equipment such as weighing scales for the reception of raw material.

Processing room

The processing room is the main place of activity. The different materials used during processing and the various pieces of equipment are kept here. Ideally, the room should be

large enough to house all the equipment needed for the various stages, to allow the process to be continuous and improve the efficiency of processing.

Sanitary facilities

All sanitary facilities - changing rooms, toilets and hand washing areas should be kept separate from the processing area to avoid cross contamination.

EQUIPMENT

The equipment needed for converting herds into meat products need not be elaborate and expensive. The amount of equipment will depend on the slaughtering and processing procedures employed. If possible, all equipment should be made of stainless steel or plastic, be rustproof and easily cleaned and sanitized.

Buying slaughtering and processing equipment requires careful thought to decide what is the best for the individuals specific needs. It is a good idea for buyers to visit trade fairs, manufacturers, equipment retailers and operating slaughtering houses to see the equipment in action. First time buyers should seek advice from experts.

Several factors that should be considered when buying new equipment include the following:

- the robustness of the equipment
- the simplicity of servicing, cleaning and maintenance
- what spares must be help
- how long it will take to get replacement parts.

There are many different types of equipment available, some of which are essential to the slaughtering and processing while others are optional, labour saving devices. It is important to think carefully about what is essential and what the plant can manage without.

The following is a guide of additional equipment available. The reference number associated with the equipment refers to the Equipment Description table

Stunning Box

Equipment provided by a entrance revolving door and a fake floor that imparts the animal slide to the place where it will be lifted up to the aerial track. The goats will be stunned inside the stunning box one after one by electrical shock or mechanical stunning. The equipment's wall must be tough enough to support the damage caused by the animals therefore it is advisable to purchase steal stunning boxes (rustproof materials like galvanized steal or stainless steal will provide a longer life to the equipment).

Equipment Ref.
1

Stunner

The stunner can be an electrical or mechanical equipment to stun the animals. The electrical stunner provides an electrical chock while the mechanical stunner imparts a mechanical punch in the animal. The stunning must happen as fast as possible to avoid pain and stress.

Aerial Track

The aerial track has the hole of guiding the carcass through the several stages of the process. The contact between the carcass and the track is done by a wheelbarrow that rolls to both sides and can be hand pushed or hand pulled. The aerial track outline is like a "G" and it must be fixed in the ceiling or supported by columns in strategic points.

Equipment Ref.
12

Platforms

The platforms are used in several stages of the slaughtering process and they can change a lot from one supplier to another. The general description consists in a metallic frame (preferably stainless steel) with enough space to the activity that need to be done, nonskid floor and stairs and handrails. The height of the platform must consider the aerial track height.

Equipment Ref.
13

Mixer

The mixer must be made of stainless steel and the main function is mixing the meat, fat, seasonings and all the other ingredients used in sausage production.

[Back to the top](#)

Meat Grinder

The meat grinder can be found in several sizes but the working principles are the same. A metallic helix revolves around the axis and pushes the meat cuts to a metallic disc with roles. After passing through the roles, the meat is cut by a sharpen blade. The size of the grinded meat can change with the kind of disc used.

Equipment Ref.
8

Sausage Stuffing Machine

This equipment is used to stuff the natural case with the prepared meat. It is composed by a cylindrical tube and a mobile piston made of chromed iron or stainless steel. The prepared meat is put inside the tube and is pressed against a funnel by the piston. The natural case goes in the end of the funnel.

Equipment Ref.
9

SMALL EQUIPMENTS

In addition to the large pieces of equipment, there are various smaller items, some of which are essential and others that facilitate the process. The following are all optional extras:

Set of knives

For cutting the carcass.

Equipment Ref.
4

Knives Sharpener

For keeping the knives in good condition.

Equipment Ref.
14

Wheel barrows

For moving the carcasses into the slaughtering house.

Equipment Ref.
15

Gas cylinder

For seingeing the animals.

Equipment Ref.
16

Electric saw

For sharing the carcass into two parts.

Equipment Ref.
4

Metallic gloves

For protecting the employees while cutting.

Equipment Ref.
17

Scales

For weighting several substances.

Equipment Ref.
11

Changing room itens

basin, toilet, paper, soap, shower and others.

Equipment Ref.
18

Water pressure hose

For cleaning the carcasses

Equipment Ref.
5

Equip description

Prices Codes	Cost (\$US)
1	0-100
2	100-500
3	500-2000
4	>2000

° Suppliers of Meat processing equipment

Processing Operation	Equipment Category	Scale	Technical Description	Price Code	Reference
Stunning	Stunning Box	S - M	Equipment provided by a entrance revolving door and a fake floor that imparts the animal slide to the place where it will be lifted up to the aerial track. The hogs will be stunned inside the stunning box one after one by electrical shock or mechanical st	4	1
Stunning	Stunner	S - M	The stunner can be an electrical or mechanical (Captive bolt pistol) equipment to stun the animals. The electrical stunner provides an electrical chock while the mechanical stunner imparts a mechanical punch in the animal. The stunning must happen as fast	3	1
Bleeding	Lifting Hook	S - M	This is a special device to lift up the animal from the stunning box floor to the aerial track. It works with an electric motor connected to a set of cogs that slow down the original rotation speed to lift the animal slowly. The chain rolls around a small	4	2
Scalding	Scalding tank	S - M	The scalding tank is an stainless steel tank supplied by hot water (generly heated by steam from a boiling) used to become the swine skin softer enough to be scraped. The pig's hair are taken out and then the carcass is pulled up in a ramp to be lifted u	4	3

Overall Process	Aerial Track	S - M	The aerial track has the hole of guiding the carcass through the several stages of the process. The contact between the carcass and the track is done by a wheelbarrow that rolls to both sides and can be hand pushed or hand pulled. The aerial track outline	1 / meter	12
Overall Process	Fixed Platforms	S - M	The platforms are used in several stages of the slaughtering process and they can change a lot from one supplier to another. The general description consists in a metallic frame (preferably stainless steal) with enough space to the activity that need to b	3	13
Overall Process	Knives Sterilizer	S - M	This equipment is used to sterilize knives that are used during the process. This stage is important to control the microorganism growth.	3	6
Overall Process	Set of Knives	S - M	The knives must be made of a stainless steel blade and a hard and antimicrobial plastic handle. The knives will be used in all the factory, but each section has its own set of knives. They need to be constantly sanitized with steam during the industrial p	1	4
Overall Process	Wheel Barrow	S - M	The wheel barrows are devices to carry and lead the carcass through the processing stages from the bleeding stage to the chilling chamber. The wheel barrows roll on the aerial track and must be easily taken out to be cleaned.	2	15
Sausage Processing	Mixer	S - M	The mixer must be made of stainless steal and the main function is mixing the meat, fat, seasonings and all the other ingredients used in sausage production. Mixing is a very common step in producing meat products. It is used to achieve four major goals:	4	7
Sausage Processing	Table Scale (Weight Scale)	S - M	This equipment is used to measure all the ingredients of all formulations. It needs to be able to measure the exact amount of the ingredient at once. Therefore, the size of the scale will depends on the amount of product is usually produced. The digital o	3	11
Sausage Processing	Meat Grinder	S - M	<p>The meat grinder can be found in several sizes but the working principles are the same. A metallic helix revolves around the axis and pushes the meat cuts to a metallic disc with roles. After passing through the roles, the meat is cut by a sharpen blade.</p> <p>The size reduction of large meat chunks is the most common process involved in the manufacturing of ground and comminuted meat products. The three main methods used are grinding, flaking and chopping. Grinders - This is probably the most common method of</p> <p>When the operator notices an uneven pattern of the meat coming out from the grinder, the machine should be stopped, and the connective tissue (or any other obstacle) trapped behind the plate should be removed.</p>	3	8
Sausage Processing	Sausage Stuffing Machine	S - M	<p>This equipment is used to stuff the natural case with the prepared meat. It is composed by a cylindrical tube and a mobile piston made of chromed iron or stainless steel. The prepared meat is put inside the tube and is pressed against a funnel by the pist</p> <p>Manual, semi automated and fully automated machines are used to stuff raw meat batter into casings. Stuffers vary in size and degree of automation but generally can be divided into two basic types: piston and pump stuffers. The piston is air driven, usin</p>	3	9
Processing Room	Metallic Table	S - M	These are special tables made of stainless steel. It has four wheels that give it mobility. This table will be used at the Visceras Room, the Cleaning Room and at the Processing Room. This table must be sanitized after and before use with steam.	2	19

Processing Room	Knives Sharpener	S - M	It is used to keep the knife's blade sharpened. It's very important to facilitate the operations during the slaughtering and the production process. Just like the knives, the sharpener must be constantly sanitized with steam during the industrial process.	1	14
Processing Room	Gas Cylinder	S - M	It is a container for petro liquefied gas that is used to the singeing.	1	16
Processing Room	Metallic Glove	S - M	The metallic gloves must be used to avoid accidents while the employees are cutting the carcass. Each employee who has a knife in on hand must have a glove in the other hand. The gloves must fit comfortably and the material should be stainless steel.	1	17
Processing Room	Electric Saw	S - M	The electric saw is used to share the carcass into two or more parts. This saw must be especial to this work, it means that the chain (or saw blade) and the recovering material must be appropriated to the activity.	3	4
Processing Room	Floor Scale (Weight Scale)	S - M	The floor scale is used to weight the trolleys loaded of meat, fat and other ingredients in large amounts. This scale can be mechanical or electronic, but the mechanical scale is generally adapted to the floor. The mechanical scale is usually much cheaper than	3	11
Cleaning	Water Pressure Hose and Nozzle	S - M	These equipment are going to be used on all the sections of the factory to clean the ground, and also the carcass. It is usually made of hard plastic, strong enough to support the water pressure.	2	5
Cleaning	Metallic Sink	S - M	This sink is going to be placed in the Cleaning Room and in the Sanitary Entrance. In the first place, it is going to be used to help the utensils cleaning.	3	19
Changing Room	Toilet	S - M	It need to have the necessary amount to give comfort to the employees. It is recommended that all the toilets are sanitized every day.	2	18
Changing Room	Shower	S - M	It is used in the end of the shift, so the employees can clean themselves before going home. It need to have the necessary amount to give comfort to the employees. It must have an antiskid floor to avoid accidents.	1	18
Changing Room	Closet	S - M	It is used to store the employee's personal objects and clothes. The working uniform should not be stored at this closet. The amount of closets depends on the number of employees.	2	18
Changing Room	Paper Towel Container	S - M	It is used to contain the paper towel that will be used to dry the hands after the use of the basin.	1	18
Salting	Salting Tank	S - M	To prepare the salted meat is used a salting tank. The pieces of meat and salt are put inside the tank and stay there until this process is completed. The tank is usually made of stainless steel and have a bottom exit to drain the exuded liquid from the meat	4	10
Additives Storing	Pallet	S - M	This is a very useful equipment. It has the objective of keeping the products far away from the ground. In this case it will be used to store salt bags and other condiments that come in large packs, and also any kind of additive that needs this kind of storage	1	20