

SMALL POULTRY ABATTOIR OPERATION

1. Stun and Bleed

The dual compartment bleeder is to enable birds to be processed in batches of six.

1.1 Stun

Stun birds for no more than two to three seconds each, by holding the beak down and placing the head in the stunner aperture such that the stunner probes are on either side of its head above the ear-holes.

1.1.1 Electric Stunning

The bird is stunned electrically by pushing its head between the stunner electrodes pre-set at a voltage according to the mass of the bird. The bird is held by its feet in one hand and the neck and head in the other hand, thus the wings are left free to flap during stunning, as this builds up blood pressure for faster bleeding. The stunning time depends on voltage and mass of bird and is normally about five seconds and is determined from experience. A stunned bird is relaxed and put into the bleeding cone where the artery is cut behind the left jowl without cutting through the windpipe. Due to the electric shock, which causes a faster heart beat, the bird has a higher blood pressure which ensures a rapid and complete bleed. Electric stunning also has the advantage of reducing the pulling force required to pluck the feathers.

1.1.2 Knife Stunning

By piercing the brain of the chicken through the palate with a slim sharp knife the bird is also stunned. Due to the slower heart beat the bleeding takes longer than it would with electric stunning. The bird also struggles a bit.

1.2 Cut the bird from ear to throat without severing the neck bones. Allow bleeding for **ninety seconds**. This is important, as the quality of the end product will be affected by too short or too long bleeding. To this end, provide a clock with a sweep second hand for the operator to get the covered tempo. All subsequent operations can be accomplished within this period.

The person stunning and bleeding will be able to work much faster than those scalding and plucking. This must not be allowed, in the interest of a good quality product.

At this rate, the capacity of the bleed and stun unit is three thousand, eight hundred and forty birds per eight hour day. This exceeds the capacity of the scalding and plucker.

THE SCALDING MUST FOLLOW IMMEDIATELY AFTER BLEEDING BEFORE THE CARCASS COOLS DOWN AND STIFFENS.

2. Scalding

Scalding is the process whereby hot water is used to loosen the feathers sufficiently to allow ease of plucking. Up to four birds at a time may be scalded.

This process is a function of time, temperature and agitation. Hot water needs to penetrate to the skin in order to loosen the feathers. Fairly vigorous movement obtained by shaking the birds, three in each hand, holding all six legs and pushing the bird deeply into the scald water but not removing it from under the surface.

Temperature should not exceed 60 degrees C. At this temperature, no more than ninety seconds are required. Local conditions will dictate what the best temperature/time requirements are, but 60 degrees C and ninety seconds are good starting points. Too hot water will possibly cook the skin, and too long time will cook even the flesh. The result in the first case will be a brownish almost blistered papery skin seen in the air-dried chilled carcass. Too long and too hot will cause the plucker to break the flesh of the birds and will be seen at the time of plucking as torn skin and even ripped flesh.

The lower the temperature, the longer time needed to scald, up to three minutes at fifty degrees C. This low temperature scald is usually used where the bird is sold as fresh chicken, since the skin colour is retained and no blemishes appear.

Scalding temperature can vary slightly with breed, sex and age of the birds. If the water has been standing still for a few minutes it must be agitated to ensure an even scalding water temperature.

THE CHICKEN MUST BE PLUCKED BEFORE IT COOLS DOWN.

3. Plucking

The tilting bowl plucker will pluck up to twelve kgs of chicken in about forty-five seconds, also depending on the quality of scalding. There is a water valve on the plucker for flushing the bowl between hatches.

The scalded chicken is held by its feet and put on the rotating drum with its back down, it is then turned once to the left and once to the right, the body and breast is thus plucked. The bird is held in a sitting position on the drum and move from left to right, to pluck the back of the legs and round the vent. It is then turned over from sitting position to pluck the front of the legs. A rapid sideways movement of the bird on the plucking drum would help to ensure a cleaner pluck. By holding the wing in the one hand and the legs in the other, the wings and neck are also plucked. After some experience the operator should pluck a bird in thirty to forty seconds. No pressure need to be used to force the bird down on the drum, its own weight is sufficient. Hand pinning should be used to remove the few flight and tail feathers after machine plucking as they are easily pulled and time would be wasted removing them on the plucker.

The feather bins hold the feathers of about 200 birds. A door is provided to remove excess feathers during operation.

Feather bins are easily remove to expose all parts of the machine for cleaning.

Typically, too short time in the plucker results in feathers remaining intact; too cold a scald will leave broken feathers stubs particularly in the tail and thigh feathers. Too much plucking will tear and mark the skin.

4. Eviscerating

Heads and feet are removed in the plucking area and washed before packing and freezing in the same area.

Head and feet will weigh approximately nine percent of live weight.

The eviscerating rail is used by placing the bird's hocks into the shackle, back toward the operator. The bird is then pushed along to a point above the eviscerating trough where the neck skin is slit, and the neck cut at a point such that the neck stub does not protrude when the bird is packed (quality).

The vent is then cut around without breaking or cutting the intestine. This is a skill which can be quickly achieved by operators if sufficient attention is given to the technique by management.

If the intestine is cut, faecal matter will spill into and onto the carcass, resulting in loss of shelf life.

Once the vent is cut free, pull it about three hundred to four hundred millimetres from the carcass so that the intestine hangs clear of the carcass. Next make a cut from the vent opening to the keel bone. The eviscerating fork is now used to scoop the visible package from the carcass.

The spoon enters down the back bone to a point between the wings, and is brought up against the breast, thus removing all the internal organs. Properly operated, each visceral packet will have the liver intact, and both hang clearly visible and intact.

Remove the visceral pack by hand and harvest the edible giblets (liver, heart, and gizzard).

Wash the carcass thoroughly both inside and outside.

The remaining offal (mala) is dropped into the trough where it is flushed into a receptacle under the opening in the trough.

5. Chilling

Place birds as rapidly as possible into the chill room in suitable racks or containers.

The faster the birds enter the chiller, the better the expected shelf life.

6. Cutting and Packing

Only cut and pack chilled birds. Deep muscle temperature should be no more than four degrees C. This process cannot be hurried up by increased coldness, just as you cannot cook a chicken faster by making the oven hotter.

Take the time – eighty minutes at one degree C will give you a properly chilled bird.

Pack and return to the holding room as quickly as possible. No meat should be exposed to the higher packing room temperature for more than fifteen minutes. This is more than enough time to bring out, cut up, pack, label and weigh a chicken and then put it back in a cold store.

7. Operations/Manning Levels

Depending on quality of management, one person per fifty birds per day would be required in a small abattoir:

- Remove from catching crate, stun and bleed – 1 operator
- Scald, load plucker – 1 operator
- Operate plucker – 1 operator
- Lift birds to EV shackles, min feather removal – 3 operators
- Pack heads and feet – 1 operator
- Evisceration: vent cut, neck, skin slit, neck off – 1 operator
- Eviscerator – 1 operator
- Harvest giblets, clean gizzards, pack giblets – 4 operators
- Remove and transport birds to chiller – 1 operator
- Cut up, pack, wrap, – 2 operators
- Whole birds, wrap, pack – 2 operators
- Despatch/load – 1 operator

Distribution management and clerical supervision all constitute employees which are too varied to comment on.

8. Equipment

Apart from the equipment in the slaughter process, there are tables, bins, shackles, chillers and cold stores, etc. required.

8.1 Tables – total required: 4

- One in heads and feet
- One in evisceration
- Two in packing

8.2 Over wrapper (stretch film) – total required: 2

- One for giblets

- One for portions

8.3 Bins

- Black for feathers and blood – total required: 3 to 5
- White for mala – total required: 1 to 2

8.4 Scales – total required: 2

- One for heads and feet to weigh only
- One for packing – weigh, compute, price mark

8.5 Sealing system

Sealing system for plastic bags and tape clips are cheap (+/- R100.00). Hog rings or any metal clips need machinery to apply, and are usually air driven, so a compressor is also needed. Tying a knot is cheap, but untidy.

Sealing using stretch film on polystyrene trays looks good and costs are fair.

9. Hygiene

In South Africa knee push wash hand basins are required. Wash hand basins should be provided in each room, and at the exit from the toilets.

Boot wash – this can be made using a simple brick work drained arrangement with a bar to rest the boot while brushing and a hose or shower head flush.

10. Drainage

Make a large 3-compartment fat trap system for the drainage. Make sure no fat or feathers can enter the soakway if one is used. Clean daily.

As far as possible, keep the drainage simple and open.

Floors must slope 1:60 to drain points. Prevent solids entering the drains wherever possible.