Meat and Meat Product processing

Level III

Based on May 2011, Version 2 Occupational standards

Module Title: - Operating Tenderiser and Mincer

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Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following **content coverage and topics**:

- Operating and maintaining tenderiser
- Tenderizing Meat
- Identifying and managing potential sources of contamination
- Monitoring flow of products

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, **you will be able to**:

- Operate and maintain Tenderiser according to Occupational Health and Safety (OHS) requirements and manufacturer's specifications.
- Tenderize meat according to workplace requirements.
- Identify and manage Potential sources of contamination according to workplace requirements.
- Monitor Flow of product according to workplace and Quality Assurance (QA) requirements.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Read the information written in the “Information Sheets”. Try to understand what are being discussed.
3. Accomplish the “Self-checks” which are placed following all information sheets.
4. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work.
5. If you earned a satisfactory evaluation proceed to “Operation sheets
6. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
7. If your performance is satisfactory proceed to the next learning guide,
8. If your performance is unsatisfactory, see your trainer for further instructions.

Information Sheet 1- Operating and maintaining tenderiser

1.1. Introduction

Tenderness is rated by consumers as one of the most important facets of the eating quality of meat (McCormick, 1994). Meat tenderness can be related principally to the connective tissue and myofibrillar protein components of muscle, while the relative contribution to tenderness of these components depends on factors such as the carcass location of the muscle, the degree of contraction of the myofibrils, and the cooking procedure applied (Lawrie, 1998).

Tenderizing is process to reduce the toughness of meat fibers in a cut of meat. It breaks down the meat fibers and softens the meat, making it easier to chew and more palatable. Tenderizing can occur before meat is sold, during a preparation process, or while it is cooking. To get the maximum benefit from the training, it is essential that you use every opportunity to consolidate what you observe and to interact between yourself and staff member in charge of your training. On compilation of the training and though the hands-on practice given, within a self-study environment and the sub course text, you will acquire some of the basic skills and techniques involved with these processes.

1.2. Personal Protective Equipment's (PPE):

- coats and aprons
- ear plugs or muffs
- eye and facial protection
- head-wear
- lifting assistance
- mesh aprons
- protective boot covers
- protective hand and arm covering
- protective head and hair covering
- uniforms
- waterproof clothing
- waterproof footwear

1.3. Operating tenderiser

- Tenderization is a mechanical process used in the manufacture of cooked ham, which produces cuts in the muscle that break the structure of the connective tissue

and puncture the brine collection areas between muscles, facilitating brine distribution and increasing the extraction surface.

- Meat tenderness important processing technology for better utilization of tough meat to benefit both producer and consumer. Inherent property determined by composition, structure and ease of chewing, disintegration, Degree of consumer satisfaction and perception.
- Toughness caused by- connective tissues and actomyosin toughness due to configurationally changes of muscle proteins- actin and myosin.
- Pre-slaughter factors- species, breed, age, sex, heredity and carcass grade.
- Post-slaughter factors- rigor mortis, post mortem, glycolysis, ageing, pH, chilling and freezing, cooking affect tenderness. Cook to a minimum internal temperature of 63oC (145oF)".
- Improving the tenderness of meat cuts and maintaining consistency in meat quality would result in attracting a larger consumer base, a higher retail price and con sumption.Therefore, enhancing meat tenderness is of significant interest to the meat industry.

There are three main factors that impact on the tenderness of meat:

i. background toughness related to collagen content,
ii. rate of tenderization during aging, and
iii. muscle contraction during the onset of rigor (Hopkins and Geesink, 2009).

- Two antagonistic processes (toughening and tenderization) take place during the postmortem (PM) storage period (Hopkins and Thompson, 2001), and the toughening process can be minimized by limiting the extent of muscle shortening during rigor development (Hopkins and Thompson, 2001). These factors are themselves affected by production traits, such as genotype, age, gender, and handling and can be manipulated to some effect by processing after slaughter and the cooking method also impacts on final tenderness
- function of meat tenderizer

- ✓ A tool used for **tenderizing meat**. This kitchen utensil, usually in the form of a mallet with a flat or point-protruding shaped surface, is used to pound against the **meat** in order to break apart the tough fibers.

- Tenderizers usually have 2 rotating inter joined barrels of short sharp blades which pieces of flat thinish meat can pass through getting pierced lots but retaining original shape.
  - ✓ Thus the now tenderised meat is still original shape but any sinuous parts have been cut through and this makes the meat softer in texture.

1.3.1. Methods to tenderize meat

A. Natural

B. Artificial

- ✓ Mechanical
- ✓ Chemical
- ✓ Electrical simulation

A. Natural tenderization: is caused by the action of enzymes already in tissues. This effect can be enhanced by quick freezing before rigor mortis sets in, and by hanging the meat at the optimum temperature and time, especially just before cooking. It is also called conditioning. This is done for ageing meat commercially; natural enzymes in meat break down tissue through dry aging. Water present in meat evaporates in turn concentrating the flavor.

B. Artificial tenderization

- Mechanical methods: mainly used for cattle or buffalo meat from young and rapidly growing animals.
  - ✓ This method includes: tumbling, massaging and blade tenderization, pressure treatment, addition of phosphate.
  - ✓ **Tumbling**- meat subjected to falling action in a rotating drum, which may
  - ✓ Be evacuated. Boneless cuts injected with brine or added brine are introduced into drum and mass tumbled for short time usually 10 minutes. Meat recovered

from drum, is held at chilling temperature for 16 hours and then returned to the drum for further short tumbling, before further processing.

- ✓ **Massaging**- meat either brined or injected with brine, meat mass is moved slowly with broad paddles operating from central shaft with a churning action. Treatment time- 16 hrs. With machine operating 20-30 minutes each hour. Energy introduced to meat, which tends to disturb fibrous structure and accelerates the penetration of curing salts, and formation of salt/water/protein solution or suspension required to produce good quality restructured product.
- ✓ **Blade tenderization**- pieces of meat passed between rollers each fitted with a large number of blades, cuts are made on the surface of meat to accelerate penetration of brine and the formation of salt/water protein complex.
- ✓ **Pressure treatment**- meat is subjected to shock when submerged in water, the treatment subjects meat to very high pressure, accelerates post-mortem glycolysis and cause improvement in tenderness. Hydrostatic pressure of 1.05*10*7 kg/m2 at 30-35°c for 2minutes reported effective tenderization.
- ✓ **Phosphate addition**-

0.3% added results in increased fat binding, emulsifying capacity and emulsion stability and diminished oxidation and rancidity.

- **Chemical methods** :
  - ✓ **Salts and acids**
  - ✓ **Balanced electrolytes**
  - ✓ **Proteolytic** enzymes
    - **Tenderization with salts & acids**

traditionally, marinating is employed to improve palatability. Salt solutions or acids (acetic acid) improves of meat, acid encourage collagenases and cathepsins work at low pH to breakdown muscle structure, also increase myofibril swelling with increasing water holding contributing to tenderness and juiciness. Lactic acid, Acetic acid, citric acid can be used for tenderization of meat.

Balanced Electrolyte

By injection of 2% by weight of water to the carcass at the pressure 40 to 100 lb. per sq. Inch with water in freshly slaughtered carcass. This method separates and ruptures the muscle bundle fibers to increase their tenderness. Cooking, pressure of water further separates, softens and ruptures the muscle bundle fibers for increased tenderness of cooked meat.

Proteolytic enzymes

Increases tenderness of meat through proteolysis of various meat fractions. Papain/papaya/, Bromelin/pineapple/ and Ficin/figs /derived from plants used for tenderization. Concentration depends upon the type of meat (thin/thick, species), purity of product; range from 0.002-0.2%.

- Electrical Simulation: ES of carcass muscles soon after slaughter accelerates their normal decline in pH- enhance tenderization. Generally applied to sheep and cattle carcasses to prevent cold shortening induced toughness and tenderize the meat, causes intense muscle contraction and speeds up the normal post- mortem processes. Improves appearance and possibly flavor different voltages have been used: from 32 to 1600 V. Different amperages have been used: from 0.5 to 6 A. Impulse frequency range from 3 to 400 Hz.
- In Ethiopia most meat industry there is no specified mechanical tenderizers, in rare case they practice natural tenderization/ageing/ method of tenderiser.

Here are four of the very best available tenderizers

i. Jaccard Blade Meat Tenderizer.
ii. OXO Good Grips Meat Tenderizer. ...
iii. Chef Master Meat Tenderizer.

1.3.2. Operate Blade Meat Tenderizer

Blade tenderization can be used on post rigor meat, and is one of the most effective and efficient ways to improve the tenderness of meat. Typically, blade tenderization is used

on raw products prior to packaging at the processing plant; however, there are machines available in the market that can be used at home. Blade tenderization has a larger impact than increased time or temperature on tenderness (King et al., 2009).It can happen with a bank of blades or needles that penetrate the surface of the meat, causing weakening of the protein structures.

It is carried out in conjunction with tumbling or massaging. Meat is typically passed through a machine 1–4 times depending on the desired amount of tenderization and the cut of meat. Blade tenderization has an advantage compared to other tenderization processes, as the process is fairly instant without the use of high temperatures, holding time, or the addition of nonmeat ingredients. Jeremiah et al. (1999) reported that blade tenderization significantly improved the initial and overall tenderness of several cuts.

It has two counter-rotating sets of cylindrical blades through which the injected meat passes. The blades cut the meat to varying depths. The degree of tenderization can be adjusted by adjusting the depth to which the blades penetrate the meat. For extremely tenderized meat, applied when extension is high, the tenderizer blades almost cut the pieces of meat apart. Where only a light degree of tenderization is required, the knives only cut into the meat to a depth of 2–4 mm.

As a general rule of thumb, the depth of the cut during tenderization correlates to the level of injection. Higher levels of injection commonly require deeper cuts to create more surface area and to allow greater amounts of protein to be activated. If lean minced meat is to be added during tumbling, for instance to highly extended products, the injected meat should be well tenderized first so that the minced meat mixes well with tenderized larger pieces of meat.

1.3.2.1. Jaccard Blade Meat Tenderizer

As a master butcher, Andre Jaccard understood that tougher cuts of meat owe their less-than-ideal texture to a high concentration of connective fibers in the muscle. He also understood that those cuts could be made more palatable by cutting some of those fibers prior to cooking them. That's the idea behind Jaccard's mechanical meat

tenderizer, which perfected that process of tenderizing meat and brought it to the United States, making his name, which he shares with the company he founded, synonymous with this process that's been adopted in countless restaurants since.

A Jaccard tenderizer utilizes several rows of thin, penetrating blades, honed to a razor sharp edge on two sides that cooks can press into any number of cuts, a series of small channels that break up the tough tissue to create a more tender texture.

Make Meat More than Just Tender

A Jaccard meat tenderizer is an invaluable kitchen tool because of its ability to transform less expensive, naturally tough cuts of meat into tender, more appetizing , but using the tool has other advantages as well.

- **Faster Cooking:** The channels created by Jaccarding allow heat to quickly penetrate to the center of the meat from both sides, meaning it cooks in as little as 60 percent the time it would otherwise.
- **Better Flavor:** Those channels also allow marinades, spices, and rubs to penetrate more deeply into the meat, resulting in a fuller, richer flavor.
- **More Even Cooking:** A third benefit of those pierced channels is that they can help cuts that vary in thicknesses throughout cook more evenly. That solves the problem of thick cuts of meat that are overcooked near the edges and undercooked in the center.
- **Juicier Meat:** Jaccarding also helps cuts retain more of their natural moisture because they doesn't contract as much as meat with more fibers intact, preventing those valuable juices from being squeezed out.

1.3.2.2. Best jaccard tenderizer models

- 200348 with 48 blades, stainless steel actuating columns, and a white handle and blade guard
- 300346N - Model H 544 stainless steel blades

A. Operate Jaccard 48-Blade Meat Tenderizer

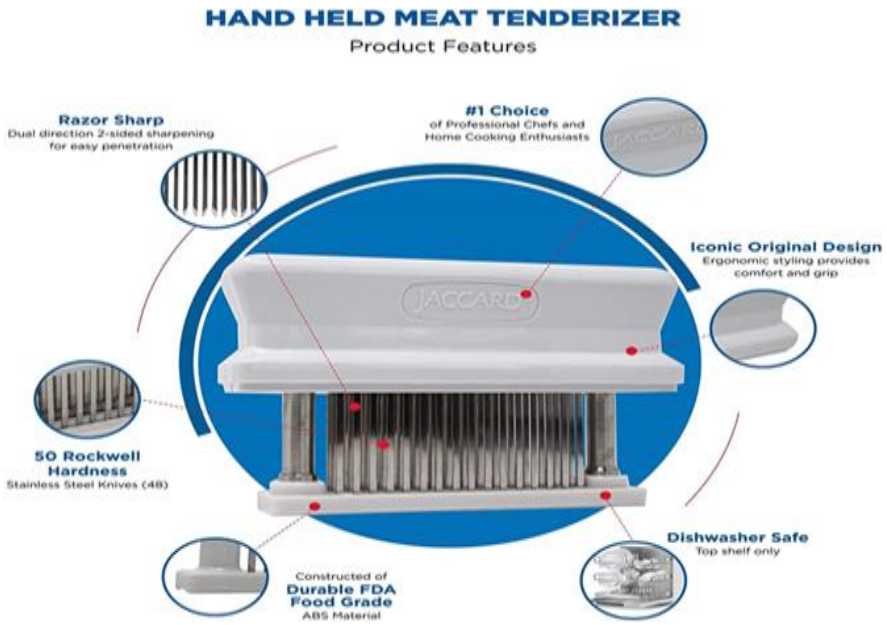


Figure 1: Jaccard 48-Blade meat tenderizer features

Figure 2: Jaccard 48-Blade meat tenderizer dimension

Features:

- Reduced cooking times by up to 40%.
- Improved penetration and absorption of marinades and rubs by up to 8 times
- More even cooking across varying thicknesses for more consistent results
- Reduced shrinkage with no loss of natural juices

Specifications:

- Easy clean-up
- Includes protective storage cover for added safety
- Dishwasher safe
- Backed by Jaccard's Limited Lifetime Warranty

Operating Instructions

- Before using the tenderizer for the first time, it is recommended that it be cleaned.
- Place steak, roast or other cut of meat on the cutting board. Remove the cover from your Jaccard® meat tenderizer.
- Gently press your Jaccard® meat tenderizer over the top of the steak, roast or other cut of meat. Avoid all bones. Repeat this process covering the entire piece of meat 2 to 5 times or as often as desired.
- For thicker cuts of meat and roasts, turn the piece of meat over and repeat Step 3 on the other side.
- Clean your Jaccard® meat tenderizer. The unit is dishwasher safe and can be cleaned simply by placing the assembled unit without the cover attached, in the dishwasher (top rack only).
- Occasionally place a few drops of salad or mineral oil on the outside of your Jaccard® meat tenderizer's actuating columns to ensure smooth operation

B. Operate Jaccard300346N - Model H 544 stainless steel blades

i. General Information

The model H meat tenderizer is designed for use on any boneless cut of meat. It has 544 stainless steel blades that cut the connective tissue of the meat without tearing it. As a result, the meat will be very tender, and cooking time is reduced up to 40%.

Read the operating instructions completely before installing and operating this machine!

ii. Notes regarding safety

- The operating and maintenance staff must be completely trained on how to operate and maintain this machine.
- The machine is not to be operated by any persons who are unauthorized, untrained, or under the legal age according to local regulations.
- Do not operate this machine when impaired or under the influence of drugs or alcohol.
- Do not use the machine for any functions besides those indicated in these operating instructions.
- If you cannot fix an issue yourself, inform maintenance and/or your after-sales service.

iii. Machine data

Table 1: Jaccard300346N - Model H 544 machine data

	Metric	English
Maximum Product width	254 mm	10 in
Maximum Product Height	120 mm	4.7 in
Product Tenderization Area	192 cm^2	29.75 in^2
Machine Length	425 mm	16.7 in
Machine width	406 mm	16 in
Machine Height with Handle	1016 mm	40 in
Machine Weight	30 kg	66 lbs.
Machine Length with Stand	584 mm	23 in

Machine Width with Stand	558 mm	22 in
Machine Height with Stand and Handle	1727 mm	68 in

iv. Assembly and Installation

Mounting on stainless steel counter top or Jaccard SS stand (sold separately)

- **SS Counter Top**
  - ✓ Place the tenderizer on the stainless steel counter.
  - ✓ Transfer the location of the mounting holes in the tenderizer base onto the counter top. Drill 7/32” or 5.5mm holes through the counter top.
  - ✓ Use the four 3/8" stainless steel bolts, nuts, and washers to secure the tenderizer to the counter top.

- **Stand Place the tenderizer on the SS stand**
  - ✓ Align the four holes located on the base of the machine with the four holes located on the top of the stand.
  - ✓ Use the four 3/8" stainless steel bolts, nuts, and washers to secure the tenderizer to the stand.
  - ✓ Using the tube of clear silicone provided in the mounting kit, lay a perimeter bead of silicone around the base of the tenderizer and the mounting surface to prevent liquids and debris from collecting under the base.

- **Connecting handle assembly to machine**
  - ✓ Insert the secondary connecting rod (70SH) into its mounting bracket on the boat frame (2-44-17-43-55HN).
  - ✓ Thread the 19AH bolt through the mounting bracket and the secondary connecting rod, add the washer and then tighten it into the aluminum housing by tightening the 20AH nut.
  - ✓ Insert handle (4-71A) into yoke of secondary connecting rod (70SH), slide bolt (33H) through the

- ✓ Yoke and handle assembly. Tighten with bolt on other side (34H), so that handle is securely tightened, but can move freely.
- ✓ Note: Do not over tighten, so that handle still moves freely.

v. Operation

- Prepare the meat by removing excess fat and trimming the meat. Check to make sure that there are no bones in the product to be tenderized.
- Place the product on the cutting board.
- Slide the board forward so that the front edge of the product is beneath the blades.
- Pull the handle down and the blades will penetrate into the meat.
- Release pressure on the handle and it will go back to the top position.
- Advance the board approximately 3" so that the next area of the product is beneath the blades.
- Repeat procedures 4-6 until the whole piece of meat is completely tenderized.
- Note: To completely tenderize a product that is more than 3" thick, tenderize one side, flip it over and tenderize the other side.

vi. Cleaning

- Disassembly for cleaning

a) Remove 3 knurled nuts (#11AE) located on the rear of the stripper frame assembly (#3-13-15H).
b) Remove hold-down plate (#22H).
c) Remove 2 knurled nuts (11AE), located on the front corners of the stripper frame assembly (3-13-15H).
d) Lift stripper frame bar and remove the bar with the separators and holders.
e) To remove the blade set, use protective gloves or a towel to hold the blade set.
f) Loosen the knurled nuts (#11AE) that hold the dovetail bar (#11H). It is not necessary to completely remove the knurled nuts, just loosen them enough to remove the blade set.
g) Remove the cutting board and wash it with soap and water in the sink.

h) Rinse the blade set, separator and holders with water to remove any pieces of meat. Then wash them in a dishwasher.

i) Use small s/s brush provided to clean channeled separators.

j) The main body of the machine can be cleaned with soap and rinsed with water.

k) To assemble machine, reverse disassembly steps a-g

vii. Maintenance

a. Check blade set for damage - light bends in the blades can be straightened using long nose pliers. If the blades cannot be repaired, cut the damaged blade off with side cutters.

b. Check the channeled separators (41AE) for damage.

c. Check the stripper frame columns (13HN) to make sure they are securely fastened in the stripper frame (3-HN).

- If necessary, apply thread locker (Loctite) to the threads on the stripper frame column (13HN) and tighten with a 17mm or adjustable wrench.

d. Check stripper frame adjustment by measuring the distance between the top of the stripper frame (3-HN) and the bottom of the boat assembly (2-44-17-43-55H). The distance measured on both sides of the stripper frame columns (13HN) should be 3 1/8" (3.125").

- If adjustment is necessary, remove shoulder bolts (116E) and jamming ring bolts (23N).
- This will release the safety lockers (58-59H). Turn the adjustable screw nut assembly (21-22AE) either clockwise to raise the stripper frame (3-HN) or counter-clockwise to lower the stripper frame (3-HN).
- When adjustment is correct, install safety lockers (58-59H) with shoulder bolts (116E) and jamming ring bolts (23N).

e. Check that the main column assemblies (9-51-31-32-56H) do not move.

- If column assemblies (9-51-31-32-56H) are loose, apply thread locker (Loctite) and tighten bolts (31AH) located under the base (1H) with a 22mm or adjustable wrench.

f. Use mineral oil to lubricate the jamming rings (12H), the handle (4-71R), stripper frame columns (13HN) and the main columns (9-51-31-32-56H).

g. Check knurled nuts (11AE) to make sure they are tight before operating the machine.

h. Pull handles down to make sure that the machine is operating smoothly.

i. make sure that the blades do not touch the board when fully pressed down. If the blades do touch the board, loosen jam nut (40H) from bolt (39H). Turn bolt counterclockwise and adjust it so that the assembly stops the handle before the blades hit the plastic board.

- After proper adjustment, tighten jam nut in place to prevent assembly from shifting.

viii. Machine photo and Drawings

Photo

Figure 3: Machine photo

Complete assembly

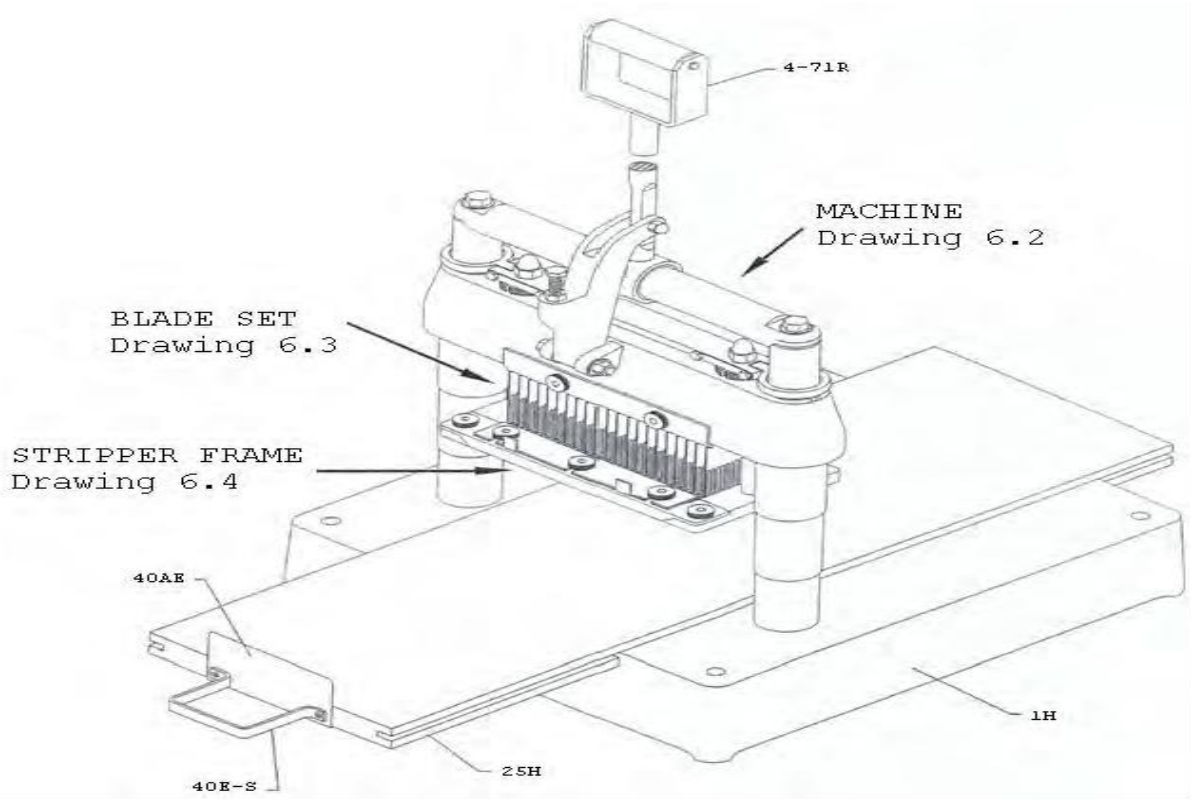


Figure 4 : Machine assembly drawing parts

Table 2: Assembly drawing part description

Part Number	Part Description
1H	Machine Base
4-71 R	Stainless Steel Handle
25H	Cutting Board
40AE	Stainless Steel Board Guard
40E-S	Stainless Steel Board Handle

ix. Machine

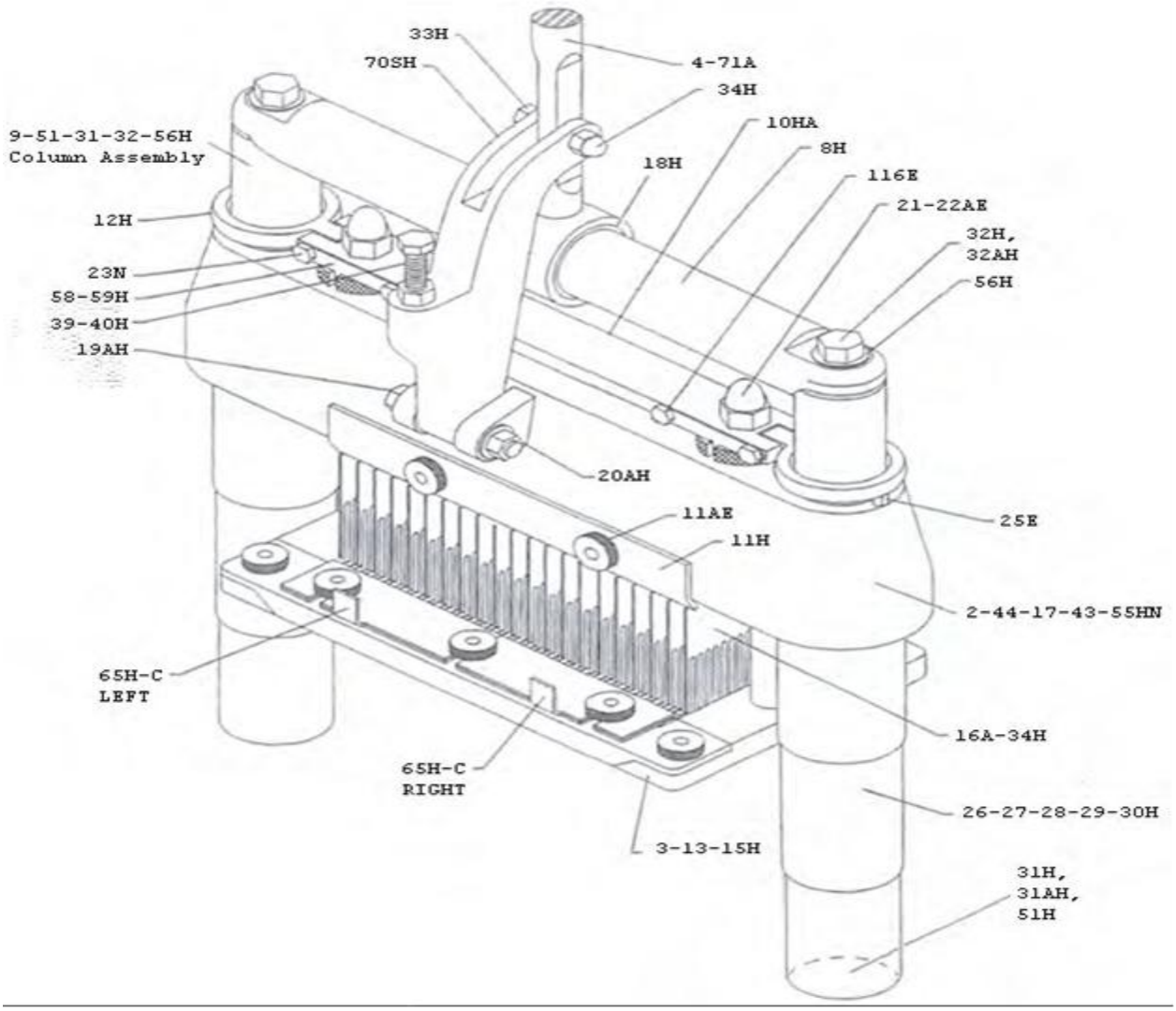


Figure 5 machine parts

Table 3 : machine Part Description

Part Number	Part Description
2-44-17-43-55HN	Boat Assembly
3-13-15H	Complete Stripper Frame Assembly
4-71A	Handle Assembly
8H	Coupling Bar
9-51-31-32-56H	Complete Column Assembly
10HA	Stainless Steel Jamming Cross Bar
11AE	Knurled Nuts
11H	Removable Dove Tail Bar
12H	Jamming Ring
16A-34H	Complete Blade Set Assembly
18H	Bushing for Connecting Rod Secondary
19AH	M12 x 70MM Bolt
20AH	12MM Nut
21-22AE	Adjustable Screw Nut Assembly
23N	Jamming Ring Bolt
25E	Jamming Ring Stop Screw
26-27-28-29-30H	Telescopic Tube Assembly
31AH	14MM Lower Column Bolt
31H	14MM Lower Column Nut
32AH	12MM Upper Column Bolt
32H	12MM Upper Column Nut
33H	M10 x 40MM Bolt
34H	10MM Nut
39-40H	Stop Screw & Jam Nut
51H	Washer
56H	Washer
58-59H	"T" Safety Locker
65H-C Left	Channeled Separator Holder
65H-C Right	Channeled Separator Holder
70SH	Connecting Rod Secondary
116E	Shoulder Bolt

- **Blade set up**

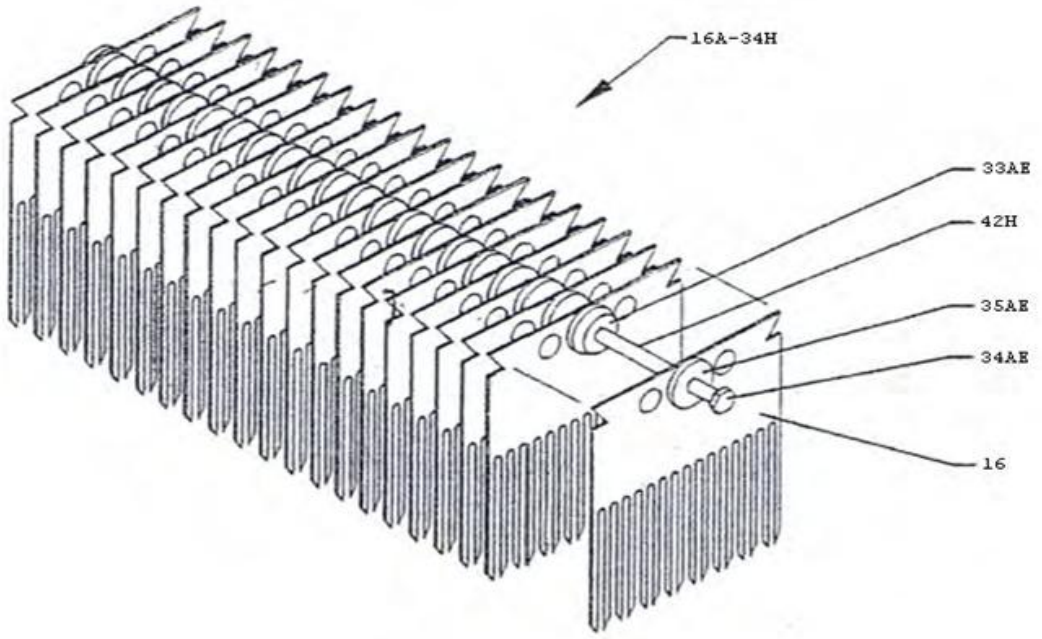


Figure 6 : Blade set up

Table 4: blade set up part description

Part Number	Part Description
16	Individual Blade
16A-34H	Complete Blade Set Assembly
33AE	Blade Separator Washer
34AE	Blade End Screw
35AE	Blade End Washer

6.4. Stripper frame

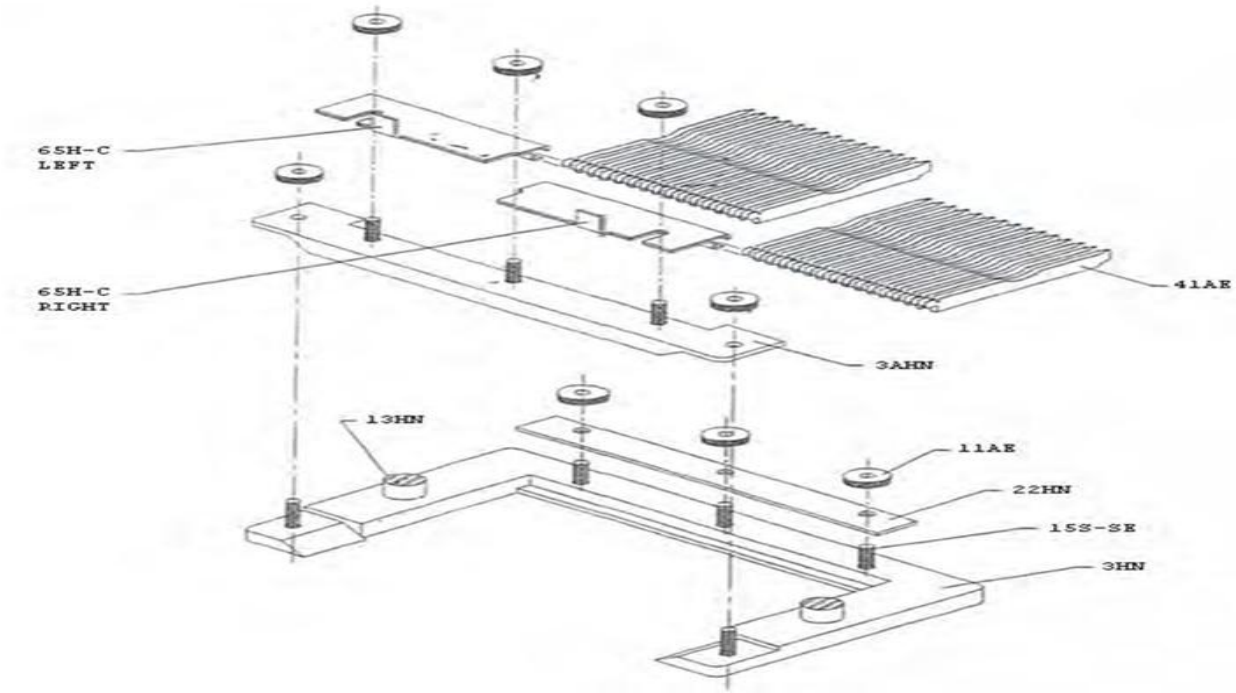


Figure 7: Stripper frame part description

Table 5: Stripper frame part description

Part Number	Part Description
3AHN	Stainless Steel Stripper Frame Bar, Front
3HN	Stainless Steel Stripper Frame
11AE	Knurled Nuts
13HN	Stripper Frame Column
15S-SE	Stripper Frame Peg Bolt
22HN	Hold Down Plate
41AE	Channeled Separator
65H-C Left	Channeled Separator Holder
65H-C Right	Channeled Separator Holder

Self-check 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer (4 point)

1. What are the factors that impact on the tenderness of meat?

   A.tenderiser B. collagen content C. ageing

2. From the given choose which one is not personal protective equipment.

   A.Safety goggles B. Safety shoes C. Clothes D. tenderizing

3. Which one of the ff. is **odd**?

   A.tenderization B. tenderiser C. Safety clothes D. tenderizing

Test II: Short Answer Questions

1. List methods of tenderizing (5 point)
2. Write down all the safety requirements tenderizing machine. (3 point)

You can ask you teacher for the copy of the correct answers.

Note: **Satisfactory rating - 10 points** **Unsatisfactory - below 10 points**

Information Sheet 2- Tenderizing Meat

2.1. Introduction

Meat tenderness important processing technology for better utilization of tough meat to benefit both producer and consumer, Inherent property determined by composition, structure and ease of chewing, disintegration and degree of consumer satisfaction and perception. Generally make softening of meat and increase palatability using different ways.

2.2. Tenderizing meat using Jaccard300346N - Model H 544 stainless steel blades

- Equipment's needed: tenderiser, knife, saw, and dish.
- To tenderize meat follow the following appropriate techniques.
  i. Wear proper PPE
  ii. Prepare all appropriate equipment's
  iii. Identify type of meat that is tenderize/beef/
  iv. Prepare the meat by removing excess fat and trimming the meat. Check to make sure that there are no bones in the product to be tenderized.
  v. Place the product on the cutting board.
  vi. Slide the board forward so that the front edge of the product is beneath the blades.
  vii. Pull the handle down and the blades will penetrate into the meat.
  viii. Release pressure on the handle and it will go back to the top position.
  ix. Advance the board approximately 3" so that the next area of the product is beneath the blades.
  x. Repeat procedures/ vii-ix /until the whole piece of meat is completely tenderized.
- Note: To completely tenderize a product that is more than 3" thick, tenderize one side, flip it over, and tenderize the other side.

2.3. Tenderizing meat using Jaccard 200348 with 48 stainless steel blades

- To tenderize meat follow the following appropriate procedures
  i. Wear proper PPE
  ii. Prepare all appropriate equipment's

iii. Identify type of meat that is tenderize/beef/
iv. Before using the tenderizer for the first time, it is recommended that it be cleaned.
v. Place steak, roast or other cut of meat on the cutting board. Remove the cover from your Jaccard® meat tenderizer.
vi. Gently press your Jaccard® meat tenderizer over the top of the steak, roast or other cut of meat. Avoid all bones. Repeat this process covering the entire piece of meat 2 to 5 times or as often as desired.
vii. For thicker cuts of meat and roasts, turn the piece of meat over and repeat Step vi on the other side.
viii. Clean your Jaccard® meat tenderizer. The unit is dishwasher safe and can be cleaned simply by placing the assembled unit without the cover attached, in the dishwasher (top rack only).
ix. Occasionally place a few drops of salad or mineral oil on the outside of your Jaccard® meat tenderizer's actuating columns to ensure smooth operation

Self-check 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer (4 point)

1. Why meat tenderness is important processing technology? Because of:

A. increasing palatability B. increasing cooking time C. decreasing consumption rate

2. Which one of the following is manual tenderiser?

A.Jaccard 48 blades B. Jaccard 544 blades C. salt tenderizing

You can ask you teacher for the copy of the correct answers.

Note: **Satisfactory rating - 10 points** **Unsatisfactory - below 10 points**

Information Sheet 3- Identifying and managing potential sources of contamination

3.1. Introduction

Meat is a very important component of food basket of India for ensuring nutritional and nutrient security of the population. Some of the issues related to meat food safety are: spoilage, microbial contamination, chemical contamination, adulteration, improper storage etc. Producing and processing meat in hygienic environment is a prerequisite for quality meat production. There are several laboratories in the country who can evaluate the quality of the meat. But consumers must be aware of indicators of freshness of meat so that they make right decision while purchase. Organoleptic features like color, smell and texture can give a primary indication of meat quality. Proper preservation of meat in low temperature is critical for maintaining meat quality and to slow down spoilage changes.

3.2 Identifying potential sources of contamination

Because of being nutritionally rich and highly perishable in nature, meat and products are at high risk of contamination and spoilage.

i. Microbiological contamination

- Microbial pathogens may invade meat and poultry products due to improper hygienic and sanitary practices during slaughtering and meat processing/ handling, storage, transportation which poses a high risk of food borne infections/ illness.
- Microbial pathogens may be transferred on to raw meat/offal and ready to eat products, e.g., from worker's hands, tools, working surfaces, equipment's, water, pests, packaging , different lot of meat/offal and during dressing. Pathogens can also grow during production, storage or transport, if condition, particularly temperature is suitable for their growth.

Insufficient training, supervision, lack of awareness of the importance of hygiene measures & quality control tools (HACCP principles) leads to ineffective management systems, and thus increases the chances of contamination of meat and products by microbial pathogens.

ii. Chemical contamination

This could occur as a result of residues tenderizing chemicals, of veterinary medicines, antibiotics, pesticides, heavy metals, processing aids etc. It may also lead to possible development of resistant strains of bacteria due to continuous exposure leading to failure of antibiotic therapies in human beings.

iii. Physical contamination

This includes contamination of meat with materials such as metal from rails, clips, tags, machinery, knife blades, grease, oil, paint flakes, rust, plastic, rubber bands, hair, glass splinters, bone splinters, wood splinters, sawdust, dust, dirt, dead insects or animal droppings. Physical contaminations are completely avoidable. Processors must take all necessary steps to prevent physical contamination of meat and meat products.

iv. Cross contamination

- Cross contamination is also a major concern in meat industry. It may occur due to the following:
  - ✓ Poor personal hygiene and working practices increases the risk of cross contamination.
  - ✓ Contaminated packaging material and breakdown of refrigeration may also result in cross contamination. Storage of spoiled meat with meat intended for human consumption may cross contaminate the food.
  - ✓ Inadequate cleaning of reusable containers, inadequate separation between exposed and packaged meat during transport, poorly cleaned vehicle or containers which are used to transport meat may cause cross-contamination of meat and meat product.
  - ✓ Inappropriate storage and handling of slaughter waste may lead to cross contamination.

v. Adulteration/substitution of meat for financial gains

These practices may include: use of meat varieties of commercially lower value, use of meat from naturally dead/ diseased animals without ante-mortem and post-mortem

examination, presence of unknown species, etc. The determination of food authenticity and the detection of adulteration are major safety issues in the meat industry owing to allergic reaction to certain meats among certain consumers and chances of contamination due to adulteration with inferior meats. Adulteration also hurts the religious sentiments of consumers due to taboo attached to meat originated from certain species.

vi. Unauthorized practices for fetching better prices for meat

These practices includes- injecting water into meat for increasing its weight, washing meat with chemicals at higher level than prescribed limits to improve its appearance with a view for increasing its acceptability etc. These practices are fraudulent practices which leads to serious public health concerns.

3.3. Managing contamination

Preventive measures to ensure better quality and safety:

Some of the preventive measures that may be useful in addressing the safety and quality concerns related to meat and poultry products are given below:

A. Safe production practices

(i) Controlled use of antibiotics and veterinary drugs

Food Safety and Standards (Contaminants ,toxins and Residues) Amendment Regulations, 2018 specifying 'Tolerance Limits' of antibiotics and other veterinary drugs in meat/meat products and should have a control over use of these antibiotics and drugs to ensure that the final product shall comply with these regulations.

(ii) Certification of animal feed /feed supplement

Controlling animal feed would play an important role in restricting these chemicals from entering the food chain. Organic feed production system and raising meat animals under organic system by following National Program for Organic Production (NPOP) guidelines of Agricultural and Processed Food Products Export Development Authority (APEDA) needs to be promoted for health and safety of consumers.

B. Safety measures to be followed by food business operators

(i) Specific hygienic and sanitary practices across entire meat food chain

All food business operator involved in meat food chain from farm to fork should follow the basic principles of safety and hygiene. Food Safety and Standards (Licensing and Registration of Food Businesses) Regulations 2011, in Part IV of Schedule 4 outlines Specific Hygienic and Sanitary Practices to be followed by Food Business Operators engaged in manufacture, processing, storing and selling of meat and meat products. This covers requirements to be followed by slaughter-houses, meat processing units and retail meat shops which include location, equipment and machinery, sanitary facilities, ante mortem and post-mortem inspection, animal welfare, personal hygiene and health requirements and others.

(ii) Complying quality and safety standards

Meat and meat product standards and safety requirements including Microbiological criteria, food additives, processing aids and contaminants limit for meat and meat products (including poultry) under Food Safety and Standards Regulations. All the traders engaged in meat business should strictly follow these regulations.

C. Safety instructions for consumers

Consumers should have a sense of the characteristics of good quality meat for making more informed choice or to get rid of any kind of dilemma while purchasing meat or poultry.

i. Meat quality

Meat quality is normally defined by the compositional quality (lean to fat ratio) and the Palatability factors such as visual appearance, smell, firmness, juiciness, tenderness and flavor (FAO). Consumers must be aware of these attributes to make right choice while purchasing of meat and meat products.

- Visual identification: The visual identification of quality meat is based on color and marbling. Meat should have a normal uniform pink color throughout the entire cut.

- Marbling is small streaks of fat that are found within the muscle and can be seen in the meat cut. Marbling has a beneficial effect on juiciness and flavor of meat. Beef, lamb and pork should also have marbling throughout the meat.
- Smell: The product should have a normal smell. This will be different for each of the species (i.e. beef, pork, chicken), but should vary only slightly within the species. Any rancid or strange smelling meat should be avoided.
- Firmness: Meat should appear firm rather than soft. When handling the retail package, it should be firm, but not tough.
- Juiciness: Juiciness depends on the amount of water retained in a cooked meat product. Juiciness increases flavor, helps soften meat - making it easier to chew, and stimulates saliva production in the mouth.
- Tenderness: Has been linked to several factors, such as the animal's age, sex or the muscle location. One important way to tenderize meat is by aging. Carcasses are aged by holding them at refrigeration temperatures for extended periods of time after slaughter and initial chilling.
- Flavor: Flavor and aroma are intertwined to create the sensation the consumer has during eating. These perceptions rely on the smell through the nose and on the sensations of salty, sweet, sour and bitter on the tongue. Meat flavor is affected by type of species, diet, cooking method and method of preservation (e.g. smoked or cured).

ii. Identification of meat adulteration

Laboratory testing is the best method for finding out the species of meat. However, Consumers can observe certain features to detect such malpractices. Fat of beef will be yellow in color which helps in differentiating it from buffalo meat, and mutton which will be white in color.

iii. Meat packaging

Packaging also plays an important role for consumer preference to decide meat quality. It maintains the quality of meat in terms of protection, preservation, information and marketing which affects consumer preference and satisfaction.

iv. Safe handling of meat and meat product

Consumers should always follow basic safe food handling rules to protect themselves and to ensure that the foods they eat are safe. Safe steps in meat handling, cooking, and storage are essential to prevent food-borne illness. You can't see, smell, or taste harmful bacteria that may cause illness. In every step of meat preparation, follow these four steps to keep food safe:

A. Clean — Wash hands and surfaces often.

- Always wash hands with soap and warm water for 20 seconds before and after handling meat/meat products.
- After cutting raw meats, wash cutting board, knife, and counter tops with hot, soapy water.

B. Separate — doesn't cross-contaminate.

- Separate raw meat, poultry and eggs from other foods in your grocery shopping cart, grocery bags, and refrigerator.
- Use separate cutting board for raw meat or poultry.
- Never place cooked food on a plate that previously held raw meat, poultry or eggs unless the plate has been washed in hot, soapy water.

C. Cook — Cook to the right temperature 63 ^{o}c.

- Color and texture are unreliable indicators of safety. Using a food thermometer is the only way to ensure the safety of meat, poultry and egg products for all cooking methods.
- Meat and poultry foods must be cooked to a safe minimum internal temperature of 75 °C to destroy any harmful bacteria.

d. Chill — Store properly

- Refrigerate or freeze meat, poultry and eggs within 2 hours of cooking or purchasing.

- Refrigerate within 1-2 hour if the product is handled at temperature danger zone (>5°C to <60 °C).
- While storing meat and poultry in refrigerator, it should be wrapped securely to maintain quality and to prevent meat juices from getting onto other food.
- Optimum storage conditions and consumption period for meat must be stored at 4 ºC for short term storage and at -18 ºC or below for long term storage.
- Chilled meat shall be consumed within 2 to 4 days of storage under normal chilling conditions.
- Frozen meat shall be consumed within 10 -12 months.

IV. Tips for consumers

Keep in mind following basic points while purchasing meat and meat products:

- Freshness
- Visual appearance (color, texture, fat content)
- Odour
- Hygienic condition of the meat outlet
- Licensing/registration status
- Personal hygiene of the retailer

.

Self-Check – 3	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer (4 point)

1. One of the following is not a physical contamination.

A. blade B. knife C. machine D. bacteria

2. Which one of the following is source of contamination?

A.microbial B. physical C. chemical D. all

3. One of the following is a chemical contamination.

A. drug B. knife C. machine D. blade

Test I: Short Answer Questions

1. List and Discus source of contamination./5 points /
2. Put the remedy for those contamination ./7points/

Note: **Satisfactory rating - 5 points** **Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers.

Information Sheet 4- Monitoring flow of products

4.1. Introduction

Meat Hygiene Assessment describes the application of two monitoring systems - the first relates to process controls in the production of the meat and the second to the physical condition of meat. Both systems utilize standardized methods to assure consistency in the outputs from monitoring and to provide an objective approach to assessing meat hygiene. The two systems complement each other and are designed to operate conjointly with the product monitoring serving to verify the effectiveness of the process controls. Importantly, they will assist in the implementation of Hazard Analysis Critical Control Point (HACCP) plans and MSQA systems. The product monitoring system includes the monitoring and control of faces, ingests, urine, and gives guidance to what is expected of corrective and preventive action. Both systems are verified by company microbiology testing. The process monitoring system assesses the efficiency of sanitation and hygiene programs, operations on the slaughter floor, in the offal room and the boning room and during refrigeration and storage of product, with a view to minimizing microbiological contamination. It requires the routine examination of the procedures used in each task and at each process step in the production areas.

4.2. Monitoring and review

Monitoring and review of food safety control systems is an essential component of application of a risk management framework (RMF). It contributes to verification of process control and demonstrating progress towards achievement of public health goals. Information on the level of control of Salmonella at appropriate points in the food chain can be used for several purposes, e.g. to validate and/or verify outcomes of food control measures, to monitor compliance with hazard based and risk-based regulatory goals, and to help prioritize regulatory efforts to reduce foodborne illness. Systematic review of monitoring information allows the competent authority and relevant stakeholders to make decisions in terms of the overall effectiveness of the food safety control systems and make improvements where necessary.

4.3. Monitoring

Monitoring should be carried out at appropriate steps throughout the food chain using a validated diagnostic test and randomized or targeted sampling as appropriate. For instance the monitoring systems for Salmonella and/or indicator organisms, where appropriate, in beef and pork may include testing at the farm and animal level, in the slaughter and processing establishments, and the retail distribution chains. Regulatory monitoring programs should be designed in consultation with relevant stakeholders, taking into account the most cost-efficient resourcing option for collection and testing of samples. Given the importance of monitoring data for risk management activities, sampling and testing components should be standardized on a national basis and be subject to quality assurance. Monitoring information should be made available to relevant stakeholders in a timely manner (e.g. to producers, processing industry, consumers).

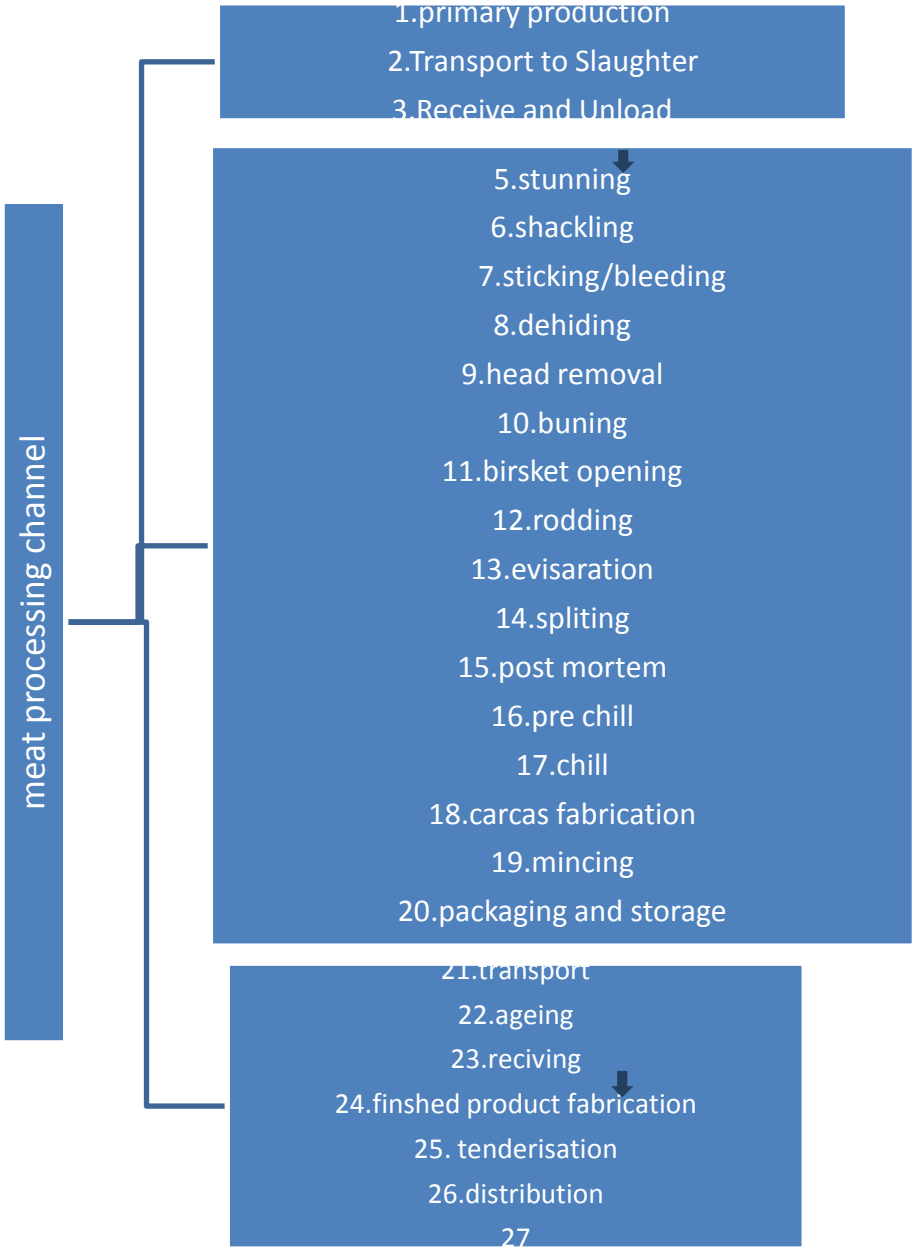
4.4. Review

Periodic review of monitoring data at relevant process steps should be used to inform the effectiveness of risk management decisions and actions, as well as future decisions on the selection of specific control measures, and provide a basis for their validation and verification.

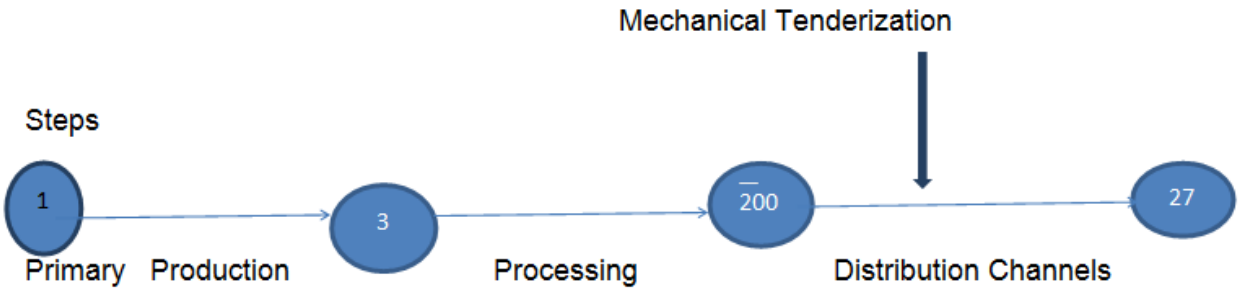
Process Flow Diagram 1: Primary Production-to-Consumption – Beef

These process steps are generic and the order may be varied as appropriate. This flow diagram is for illustrative purposes only. For application of control measures in a specific country or an establishment, a complete and comprehensive flow diagram should be drawn up.

Diagram 1: Primary Production-to-Consumption – Beef



Availability of control measures at specific process flow step



This is the point in the process where the meat is subjected to the process of breaking fibers mechanically or manually. This step can be a cross-contamination point if the procedures and handling are not performed in a sanitary manner and by trained and experienced employees.

Control measures

Products should be stored at temperatures to prevent the growth of Salmonella. Equipment used for this operation should be adequately maintained and adjusted. In order to avoid cross-contamination, equipment and environment should be cleaned on a regular basis and good personal hygiene practices should be followed by employees.

Processes such as mechanical tenderization may potentially increase contamination in the meat. There should be increased awareness when handling of the meat throughout the rest of the food chain.

Self-Check – 3	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

1. Discus control measures during tenderization ./5 points /
2. List at specific process flow steps of tenderization./7points/

Note: **Satisfactory rating - 5 points** **Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers.

Operation Sheet 1- Tenderizing Meat using Jaccard 48-blade tenderiser

Procedures for tenderizing meat using Jaccard 48-blade tenderiser

I. Wear proper PPE
II. Prepare all appropriate equipment's/ tenderiser, knife, table, dish /
III. Identify type of meat that is tenderize/beef/
IV. Before using the tenderizer for the first time, it is recommended that it be cleaned.
V. Place steak, roast or other cut of meat on the cutting board. Remove the cover from your Jaccard® meat tenderizer.
VI. Gently press your Jaccard® meat tenderizer over the top of the steak, roast or other cut of meat. Avoid all bones. Repeat this process covering the entire piece of meat 2 to 5 times or as often as desired.
VII. For thicker cuts of meat and roasts, turn the piece of meat over and repeat Step 6 on the other side.
VIII. Clean your Jaccard® meat tenderizer. The unit is dishwasher safe and can be cleaned simply by placing the assembled unit without the cover attached, in the dishwasher (top rack only).
IX. Occasionally place a few drops of salad or mineral oil on the outside of your Jaccard® meat tenderizer's actuating columns to ensure smooth operation

Operation Sheet 2- Tenderizing meat using Jaccard300346N - Model H 544 stainless steel blades tenderiser

Procedures for tenderizing meat using Jaccard300346N - Model H 544 stainless steel blades tenderiser

I. Wear proper PPE
II. Prepare all appropriate equipment's/ tenderiser, knife, table, dish /
III. Identify type of meat that is tenderize/beef/
IV. Prepare the meat by removing excess fat and trimming the meat. Check to make sure that there are no bones in the product to be tenderized.
V. Place the product on the cutting board.
VI. Slide the board forward so that the front edge of the product is beneath the blades.
VII. Pull the handle down and the blades will penetrate into the meat.
VIII. Release pressure on the handle and it will go back to the top position.
IX. Advance the board approximately 3" so that the next area of the product is beneath the blades.
X. Repeat procedures/ 7-8 /until the whole piece of meat is completely tenderized.

- **Note:** To completely tenderize a product that is more than 3" thick, tenderize one side, flip it over, and tenderize the other side.

LAP TEST	Performance Test

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **2** hour. The project is expected from each student to do it.

Task-1 Perform Tenderizing beat using Jaccard 48-blade tenderiser

Task-2 Perform Tenderizing beat using Jaccard300346N - Model H 544 stainless steel blades tenderiser

LG #28	LO #2- Meat Mincer

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Work place requirements for operating mincer
- Operating mincer
- Monitoring input and output

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Operate mincer in accordance with workplace requirements and manufacturer's specifications.
- Operate Mincer in accordance with Occupational Health and Safety (OHS) requirements.
- Monitor Input and output to ensure compliance with Quality Assurance (QA) requirements

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Read the information written in the “Information Sheets”. Try to understand what are being discussed.
3. Accomplish the “Self-checks” which are placed following all information sheets.
4. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work.
5. If you earned a satisfactory evaluation proceed to “Operation sheets
6. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
7. If your performance is satisfactory proceed to the next learning guide,
8. If your performance is unsatisfactory, see your trainer for further instructions.

Information Sheet 1- Work place requirements for operating mincer

1.1. Introduction

The most important concept to remember is that you are responsible for your own safety and the safety of others. Most safety practices are common sense. Unfortunately, they can be forgotten or overlooked unless you make safe practices a habit or an instinct.

1.2. General Safety

By doing things right, you and your co-workers will commit yourselves to safety on the job and everyone will benefit. Accidents occur in many ways but most often can be traced back to one of two basic factors: ignorance or carelessness. You must always be concerned with your own safety and with the safety of others around you.

The following is a general list of safety precautions you must observe in any work area:

- Don't fool around. "Horseplay" is one of the biggest causes of injuries on the job and it may be grounds for dismissal.
- Never work while under the influence of drugs or alcohol, as you are a hazard to yourself and your co-workers.
- Pay particular attention to moving objects, such as equipment, dollies, mixers, and slicers.
- Walk does not run, in the work areas.
- Stay completely alert on the job.
- Avoid back strain by lifting properly.

1.3. Meat industry accidents and their causes

Over 90% of all accidents are preventable, and three basic rules of meat industry safety, if enforced, will significantly reduce the likelihood of meat industry mishaps.

- Do not run: People who rush around in the meat industry tend to take chances that increase the likelihood of an accident.

- Keep your mind on your work: People who let their attention wander are a hazard to themselves and others around them. Lack of interest, personal problems, and distraction by others can all lead to serious accidents in the meat industry.
- Observe all the rules for operating meat industry equipment. Never operate kitchen equipment until instructed in the correct procedures.

In meat industry, safety is everyone's job. It is a responsibility that must be accepted throughout the working day. As stated many times before, accidents are caused they do not just happen. They are the result of not knowing the proper way to do a task, carelessly performing an operation or job, or not being consciously aware during the performance of a task. It is wise to remember that careless workers not only jeopardize their own health and well-being, but also jeopardize those around them.

Cooking is considered a fairly safe occupation, but hazards certainly do exist, not only in food preparation but in other related tasks as well. The most common accidents in the meat industry are cuts, burns, falls, and strains. All of these accidents happen when extreme carelessness or general horseplay is present. Carelessness and horseplay can be neither justified nor allowed in the meat industry.

1.3.1 Cuts

Cuts are all too common in meat industry because knives and other cutting implements are constantly in use. These cuts, and the seriousness of the cuts, however, can be held to a minimum by using ordinary good sense, by paying attention to the proper safety rules, and by practicing proper cutting procedures. Once the skill of using a knife is developed, accidental cuts should not occur very often. However, when and if they do occur, they should be treated properly and without delay. If infection sets in, it can result in more serious consequences and the loss of many working hours.

- Remember: preventive care is always cheaper than injury treatment!

1.3.2 Burns

Two types of burns occur in the meat industry: minor and serious. Minor burns are usually a result of wet or damp towels used to handle hot equipment's, or from bumping an exposed area of your arm against a hot surface like and oven rack.

More serious burns occur when grease is splashed, when steam escapes or is released too quickly, or when gas is turned on or released unknowingly. Burns are generally more painful than cuts, and they certainly take more time to heal. If the burn is severe enough to cause a blister, it should be treated promptly by trained medical personnel.

1.3.3 Falls

Falls can cause some of the most serious injuries in the meat industry. They may disable or incapacitate a person for life. Falls are caused by extreme carelessness, wet floors and aisles, spilled food or grease, and by torn mats or warped floor boards.

1.3.4 Strains

Strains may not be as serious as other types of injuries, but they are painful and can result in the loss of many working hours. They are caused by carrying loads that are too heavy and by improper lifting practices. Most strains do not require medical attention, but they do require time and care to heal properly.

1.4 Safety Practices for meat industry

Meat industry has many safety hazards. It contains electrical equipment, and sharp tools. These hazards, combined with the busy, often frantic pace in meat industry, make it very important that you work carefully while giving constant attention to the safety practices described below.

1.4.1 Lock-out procedures

Workspace regulations require that all powered machinery or equipment shut down for maintenance or repair must be secured against the possibility of the equipment being accidentally turned on while being worked on. To safeguard the person working on such equipment, lock-out procedures must be posted near the equipment, and the procedures listed must be followed before repairs or maintenance can start.

Locking out a machine usually means the power feeding the machine is disconnected either by pulling a plug, placing a switch in the off position, or turning a circuit breaker to the off position. The disconnected circuit is then secured in the inoperative position by

the use of a padlock. The person doing the maintenance or repair keeps the key to this lock until the work on the machine has been completed. The worker then removes the lock and the machine is again operable. Depending on the situation, the lock might be used to secure the power switch of the machine or it might be used to lock shut the door to a circuit breaker panel where the thrown breaker is located.

If the machine is not wired into its own power circuit but simply plugs into the wall, the lock-out procedure may require that the machine be turned off with its power switch and unplugged from the power receptacle. The plug end of the machine must be kept in plain view of the repair person so no one can inadvertently restore power without the repair person's knowledge. Meat industry machines that must be locked out before repairs or maintenance can commence include, but are not limited to, meat saws, mixers, meat grinders/mincer, garbage disposal systems and meat slicers. You must be aware of the lock-out procedures that are to be followed before repairing or cleaning any machine. Lock-out procedures must be clearly posted by management near each machine.

a. mincer lock-out procedure

- Shut off mincer at stop/start switch.
- Shut off at disconnect behind mixer.
- Apply lock to disconnect. Put key in pocket. Do not leave key in lock!
- Attempt to start miner, reset or return switch to "off" position.
- Complete work on miner.
- Ensure bowl and mincer are clear of loose pieces, tools, etc.
- Remove lock.
- Restart mixer and run up to operating speed.

b. Procedures for equipment

- Never use any machine you have not been trained to use.

- Pull plug or throw switch to off position before cleaning or adjusting any machine. Keep fingers, hands, spoons, etc., away from moving parts. Wait until machine stops before moving food.
- Check all switches to see that they are off before plugging into the outlet.
- Particular care must be taken when cleaning the slicing machine.
  - ✓ First pull the plug.
  - ✓ Turn the gauge to zero in order to cover the edge of the blade
  - ✓ Do not touch the edge of the blade
  - ✓ Clean the blade from the center out.
  - ✓ Clean the inside edge of the blade with a stick that has a cloth wrapped around one end.
- Do not start a mincer until the bowl is locked in place and the attachments are securely fastened.
- When using a mincer, turn off motor before you scrape down the sides of the bowl.
- Use a wooden or plastic plunger rather than your hands or spoons to push meat down into a meat grinder.
- Keep your hands to the front of the revolving bowl when operating the food cutter. This is one of the most dangerous pieces of equipment in the meat industry.
- Never start a machine until you are sure all parts are in their proper places. If it is a machine that operates with gears, check the gear position.
- You must be aware of the lock-out procedures that are to be followed before repairing or cleaning any machine. Lock-out procedures must be clearly posted by management near each machine.
- When using electrical power equipment, always follow the manufacturer's instructions and recommendations.
- Do not wear rings, a wristwatch, or a tie when operating electrical power equipment.

c. Procedures for sharp utensils

- Use the right knife for the job.
- Do not grab for falling knives. When a knife starts to fall, jump backward to get out of the way.

- Always carry a knife with the tip pointing downward and with the cutting edge turned away from your body.
- Never talk while holding a knife in your hand. Should you start to gesture with the knife, there could be serious consequences.
- When cutting with any knife, always cut away from your body. This also applies to potato peelers or any implement with a cutting edge.
- Never place a knife in hot water as it will cause cracks in the wooden handle. Never reach into soapy water in search of a knife.
- Use a cutting board at all times. Never cut on metal.
- Place knives in designated knife drawers. Preferably, knives should be placed in knife racks for proper storage.
- When cleaning or wiping a knife, keep the sharp edge turned away from your body.
- Always use a sharp knife; it is much safer than a dull one. Less pressure is required on a sharp knife, and the chances of a sharp knife slipping are much less.
- Always cut with a back and forth sweeping motion, not with downward force.
- Use knives for the purpose for which they are designed, not as levers or wedges or as bottle or can openers.
- Pick up knives by the handle only.
- Take a firm grip on a knife handle and always make sure the handle is free of grease or any other slippery substance.
- Never force a meat band saw; it may jump from the bone.
- When using a cleaver, be sure the item to be chopped is sitting solidly. Note: Avoid chopping large, hard, or brittle bones with a cleaver as the bones may splinter and become as dangerous as flying glass.
- When grating foods, never work the foods too close to the cutting surface.

1.5 Avoid burns

- Use dry towels when handling hot equipments as wet cloth conducts heat more readily than dry cloth.

- Avoid splashing grease on top of the range. Grease will ignite quickly, causing a fire. Do not throw water on a grease or fat fire: smother it. Use a foam extinguisher or a wet towel.
- Always give notice of “hot stuff” when moving a hot container from one place to the other.
- Avoid overfilling hot food containers.
- Place a lighted match to gas jets before turning on the gas. Ventilate gas ovens for a few minutes before lighting by leaving the oven door open so any gas pockets that might be present can escape.
- Know the location of fire extinguishers; know how and when to operate them.
- When placing food in hot grease, always let the item slide away from you so the grease will not splash toward you and cause a serious burn.

1.6. Keep floors safe

- Wet floors are dangerous. Keep them dry.
- Pick up or wipe up any spilled item immediately, particularly water or other similar liquids.
- When liquid or fat is spilled, have one person watch the area and warn others of the danger while another goes for a mop. Small areas may be sprinkled with salt to provide traction until the spill is cleaned up.
- Walk. Do not run or slide across the floor.
- Never leave utensils on the floor. Someone is sure to trip over them, and it may be you.
- Keep all traffic areas clear of boxes, garbage cans, portable equipment, mops and brooms, etc.
- When mopping kitchen floors, do only a small area at a time.
- Using rubber mats behind the range is a good practice. However, mats must be kept in first-class condition by daily cleaning and by replacement when they begin to wear.

1.7. Store supplies safely

- When opening boxes, crates, etc. remove the nails. Do not bend them down.
- Always store heavy materials on bottom shelves, medium-weight materials next, and light-weight items on top shelves.
- Get rid of all dirt, grease, and trash promptly to reduce fire hazards and to eliminate breeding places for rats and cockroaches.
- Be sure light bulbs are guarded. As a precaution against fire, do not store any materials within 45 cm (18 in.) of any bulb.
- Use ladders, not boxes or chairs, to get things from high shelves. Always have three points of contact when moving up and down the ladder. Do not over reach, and never stand on the top two rungs of the ladder.

1.8. Dispose of refuse properly

- Place food scraps in proper containers.
- Do not allow containers to overflow. Empty them before they are completely full.
- Do not stack full refuse containers.
- Report broken or defective containers.
- If wearing gloves while disposing of refuse, you should remove the soiled gloves once the job is done and, when returning to work, wash and sanitize hands properly
- Push garbage down using a tamper or other tool. Do not push it down with your hand or foot!

1.9. Lifting practices

- Keep your back straight, but not necessarily vertical. Have a sure grip on the object.
- Keep the object close to your body.
- Bend your knees before lifting.
- Lift with your legs, not with your back.
- Call for help to lift or move heavy containers.

1.10. Housekeeping

Good housekeeping is an important part of safety and accident prevention. Many unsafe conditions can be corrected before they result in injury. Good housekeeping is a necessity for a safe and sanitary meat industry. A clean work environment leads to pride in workmanship and a safe operation. Good housekeeping procedures include the following:

- Do not block exits.
- Change burned-out light fixtures in work areas, walkways, and exits.
- Keep floors and work areas clean, dry, and grease-free.
- Keep steps and ladders in serviceable condition.
- Keep emergency equipment clean and unobstructed.
- Ensure that all signs and caution labels are in good condition and visible.

1.11. Personal Protective Equipment

In addition to being aware of the mechanical hazards in the kitchen, it is important that you use the correct protective clothing and equipment. Wearing personal protective equipment (PPE) can prevent accidents from happening. As a worker, you are responsible for the following:

- Making sure your uniform is well fitted.
- Keeping all uniforms clean and in good condition, not frayed or badly worn.
- Making sure sleeves are kept buttoned at the wrist, cuffs on overalls and trousers are be eliminated, and trouser legs are long enough to hang outside boots.
- Wearing specific personal safety equipment such as goggles, hearing protection, gloves, and aprons when required.

To ensure that you are protecting yourself, your personal protective equipment (PPE) list should include the following items.

1.11.1 Clothing

This includes well-fitted pants and jackets with all buttons fastened. Sleeves should be close fitting because sleeves that are loose and flowing are potential fire hazards when working over open gas burners. Health regulations require that all food handlers wear

hair nets or use other approved methods for keeping hair under control. Aprons should be made of non-combustible and flame-resistant materials that do not melt under heat.

1.11.2. Footwear

The OHS Regulation requires that approved footwear must be worn by employees in all industrial occupations. Ensure your footwear is sturdy and provides enough back support to not cause future back problems. Footwear suitable for commercial foodservice establishments must have a non-slip sole and a closed toe and closed back.

1.11.3 Hand protection

The most common type of gloves used in food service establishments are natural rubber latex gloves, synthetic rubber gloves, and vinyl gloves.

Mesh gloves should be used when cleaning the meat slicer. Thick plastic, gloves should be used when handling cleaning products.

1.11.4 Eye protection

Eye protection in the form of safety goggles or masks should be worn whenever there is a chance of eye injury. Particles flying through the air can easily land in your eye and possibly do permanent damage. Eye protection is important, for example, when working with the band saw cutting through bone or when working with corrosive cleansers that could splash into your face.

1.11.5 Hearing protection

Approved hearing protection must be worn when high-level noise conditions exist.

1.11.6 Respirators

Respirators should be used to protect you from inhaling harmful fumes or vapors such as those that often come from concentrated meat industry cleaning liquids.

1.12. Equipment Safety

Extreme care should be taken when operating equipment. Before you attempt to operate any tool or piece of equipment, you must be fully trained by an experienced operator. Make sure that all guards are in place and function properly and that all electrical connections are properly made. You should observe the following precautions when using equipment:

- Understand the correct operating procedures and safety precautions before operating a piece of equipment.
- Ensure that all guards are in place and functioning before any machine is started.
- Report defective or unsafe equipment to a responsible individual to prevent serious injury.
- Do not distract or interfere with the equipment operator.
- Make sure that the cords to electrically powered tools are in good condition, with no frayed parts or bare wires showing and make sure that the tools are properly grounded.
- Keep edge-cutting tools properly sharpened so that they do the job well and do not have to be forced because of dull edges.
- Use tools only for their intended use and make sure the size of the tool is right for the job.
- Report to your immediate supervisor any tool or piece of equipment that is broken or does not function properly.

1.13. Ventilation systems

The environment in which you work is very important. The air around you may be filled with smoke and steam.

Meat industry has some type of ventilation equipment usually housed in the same units as the fire suppression systems. Many other types of ventilation equipment may be found in workplaces. It is important, regardless of where you are working, to become familiar with the ventilation equipment or systems and use them.

1.14. Emergency shutdown systems

Many kitchens have emergency shutdown systems or “panic buttons.” These are installed so that only one switch has to be thrown to kill the power to a large amount of equipment. These systems are to be used when a person is being electrocuted or is caught in a piece of machinery. Under these circumstances, you do not have time to hunt for and throw the correct switch. Fast action is necessary. Hit the panic button.

When you enter a meat industry for the first time, locate and learn how to use the emergency shutdown.

1.15. Guards and barriers

Guards and barriers are used as safety devices on many pieces of equipment used in a modern kitchen. Always use them to ensure you are operating the machinery in the safest way possible. Never operate a piece of equipment unless all guards and barriers are in position.

1.16. Utilities

Each time you have a new work location, check the location of the shutoffs for all of the utilities. That way you will be prepared for an emergency.

1.16.1 Electrical

You should make yourself aware of the location of the main panel or sub-panels being used, and you should learn how to shut them off in case of an emergency. If you must shut the power off, notify your supervisor right away. Obtain permission from the electrician before using a new service.

Electrical safety

Even though you may normally deal with low voltages and current, the values are never far away from lethal levels. You can receive a shock or burn from any common electrical circuit. The severity of the electrical shock depends on four factors:

- The amount of current that passes through the body
- The path that the current takes through the body

- The frequency of the current
- The length of time that the current flows within the body.

1.16.2 Water supply

Find out where the water shutoff is located in your meat industry. If a pipe breaks or bursts, the water may damage material, tools, and equipment or work already done. In addition, water may create an electrical hazard if it comes in contact with electrical panels or outlets. If you must shut the water off, notify your supervisor at once.

1.16.3 Gas supply

Locate the gas shutoff in the meat industry. Escaping gas can cause an explosion that could injure someone or do great damage. When the valve handle is running parallel with the gas line, the supply of gas is flowing and on. By turning the valve handle 90 degrees (that is, perpendicular to the gas line), you can shut off the gas supply. If you must shut off the gas, notify your supervisor immediately. Remember, you must have the gas flowing in order to light the pilot lights on equipment.

1.16.4 Other services

Other services, such as telephone, cable, and Internet, do not usually present any danger to people, and there is no way you can shut them off.

Self-Check – 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

1. Discus general Safety of work place.
2. Write down all the safety requirements for mincing machine operation.
3. Discus Mincer lock-out procedure. (3points)
4. What are the safety Practices for meat industry?
5. What are utilities you should check the location of the shut offs in industry?

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Information Sheet 2- Operating mincer

2.1. Introduction

Mincer is a machine which cuts meat into very small pieces by forcing it through very small holes.

There are two types of meat mincers: the manual ones, which have a crank that you have to turn in order for the meat to pass through and be ground, and the electric ones, which achieve the same result with the push of a button.

2.2. Manual Meat mincer

Step by step guide on how to assemble a manual meat mincer

a. How to assemble a manual meat grinder

Having a grinder is one of the sure things of making your work in the kitchen easy. To use the grinder with ease, you need to know how to set it up. Assembling manual grinders is not that easy. You need to follow one step after the other to ensure that you are getting it right.

Figure 8:photo of manual mincer

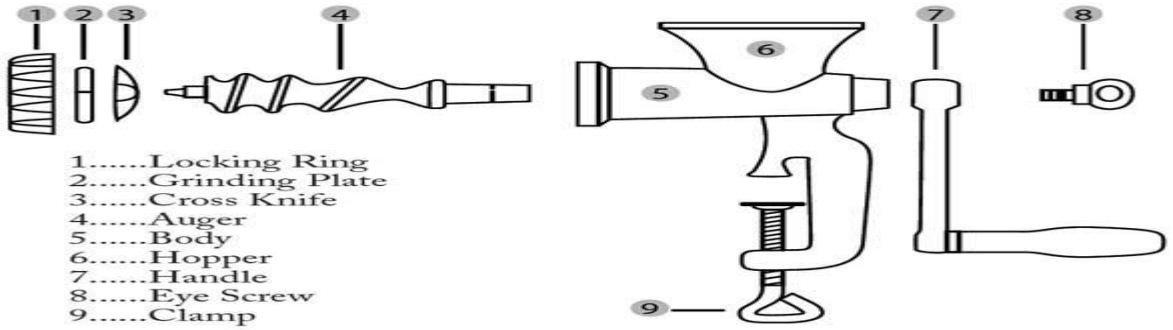


Figure 9: Manual Meat mincer assemble drawings

b. Steps To Follow When Assembling The Meat Grinder

#Step 1#

- First, ensure that the grinder parts are clean and free of rust. They should also be dry and ready for use. The blades also need to be sharp if you want your work to be easy. Grinders are of different brands. This means that their parts may vary. However, there are general parts. These include; the main body, handle with a feeder, metal plates, cutting blades, a nut and collar. All these parts need to be fitted to ensure that the grinder is working.

#Step 2#

- The second step is placing the handle into the main body. This handle should be fitted in such a way that it will turn freely. If fixed inappropriately, it will have a lot of rubbing. This rubbing impedes the grinder's grinding and extruding action. This can also damage the working surface or injure the person using the grinder.

#Step 3#

- Thirdly, the screw-like part of the handle will be seen to protrude. This is where you will fix the cutting blade and the extrusion plate. Always ensure that you have the right extrusion plate for your grinder. The size of the holes in this plate determines the quality of ground meat you are getting. The smaller these holes are the finer your meat will be. Today, we have newer grinder models that come with a shorter

mounting bolt. This bolt holds the cutting blade and the extrusion plate. This bolt is longer in old models with the plates being held by a wing nut or hex nut. In these models, there is only one cutting blades and the extrusion plate is absent.

#Step 4#

- The fourth step includes mounting the grinder onto the work table. This work table should be strong and stable. Use wedges to secure the grinder on the underside of a counter or table. These wedges should be 1 or 11/2 inches thick. This thickness is very important in keeping the grinder in place. If the grinder is not secured on the counter, it can move about when grinding. This can make grinding difficult or uncomfortable. With the grinder secured on the table, grinding can commence.

#Step 5#

- The fifth step is disassembling the grinder. After using the grinder, you will need to disassemble it and prepare it for storage. Unlike electric grinders, manual grinders are easy to disassemble. You just need to reverse the assembling process. Care needs to be taken when handling the cutting blade. This bade is not only sharp but is also dangerous. It is designed to cut through tough game meat. This means that it can cut through your hand with ease. Always be careful with the blade**.**

#Step 6#

- The sixth step is cleaning the grinder. You may have cleaned all the parts before starting the assembling. Yet it is advisable that you clean the grinder after using it. The grinder can get dirty during the grinding process. This cleaning should be done with warm soapy water. Wash it thoroughly and dry each and every part of the grinder. To maintain the parts for a long time, always coat the grinder with a light coat of oil. You can use cooking oil for this purpose. The oil prevents the parts from rusting.

2.3. Industrial electric mincer

2.3.1. Description of the machine

This mincer is a simple, compact and highly performing machine.

- As it has to be used to mince foodstuff, the parts in contact with the product have been chosen to ensure the highest degree of hygiene.
- The structure is made of stainless steel.
- The hopper is made of polished stainless steel to ensure the highest degree of hygiene and to facilitate the cleaning.
- The tools are made of stainless steel to ensure high resistance and hygiene.
- The machine has a modern design; it is solid and made of aluminum with the structure made of stainless steel.
- The feed openings are stainless steel casting with the possibility to apply the total or partial UNGER system.
- The machine is equipped with a reverse rotation sense of the screw propeller by means of a selector.
- The feed opening lock is rigid to give a better cut and to increase the life of the plates and knives.
- The three-phases and single-phase motors are ventilated with the following advantages:
  - ✓ maximum efficiency and life of the motor;
  - ✓ increase of the working effectiveness due to less interruptions;
  - ✓ Low heating level to keep meat fresh and unchanged.

2.3.2 Use of the machine

Machine has been designed and manufactured to mincemeat and foodstuff. The mincer must be used in professional environment and the operators in charge of the machine must belong to this specific sector and he must have read and understood this manual. The machine must be used only if it is safely installed on a work table. The pieces of meat must enter completely in the feed opening and they must not overflow the hopper.

2.3.3 Improper uses

Machine must be used only for the specific purpose it has been manufactured for:

- Do not use the machine to mince foodstuff other than meat or similar products.
- Do not use the machine if all the safety devices are installed and function correctly to avoid any risk to be injured.
- Do not reach electrical elements if the machine has not been disconnected from the power supply: there is a risk of electric shock.
- Do not operate the machine with products that cannot completely enter the hopper.
- Do not wear clothes that do not respect safety regulation. Consult your employer to know the safety regulations in force and the accident prevention measures to adopt.
- Do not turn on the machine if it is broken.
- Before using the machine, make sure that any dangerous situations have been eliminated. If you notice any irregularity, immediately stop the machine and call the person responsible of the maintenance.
- Do not let unauthorized personnel intervene on the machine. If there is an accident due to electrical power supply, the first thing to do, is to remove the injured person from the conductor (he has probably lost his senses).
- “This operation is dangerous”. In this case the injured person is a conductor: to touch him means to be electrocuted.
- It is necessary to disconnect the machine from the power supply immediately, if this is not possible, remove the victim using insulating materials (wood or PVC, fabric, leather, etc.).
- It is necessary to call the medical assistance and hospitalize the patient immediately.

2.4. Machine data

the description of the machine must be precise: “Model”, “Serial number” and “Manufacturing year”, this will make things easier for our service center.

2.4.1 Protections and safety devices

Warnings!

Before using the machine, make sure all the safety devices are installed and function correctly. At the beginning of each shift check the presence and position of the safety devices. If they are not correctly installed or if they are missing, call the Maintenance operator.

Figure 10: Protections and safety devices

Key

I. Meat exit, plate holes of less than 8 mm.

In this case the fingers cannot enter the holes. On request, it is possible to install plates with outlet holes larger than 8 mm. In this case the user must provide a protection for this opening.

II. Hand protection.

The hopper is equipped with a hand protection "2" Fig 10 Complying with the Ministry of Labor and Social Security n° 66 of the 05.09.79.

III. Stainless steel hopper solidly fixed to the feeding opening 4.Protective device for electric elements. The lower part of the machine is closed by a protection which prohibits anything entering to the electrical elements placed inside. Micro on the hopper in the lower part of the hopper, there is a magneto at the level of the safety sensor.

2.4.2 Working position

The correct operator's position to grant an excellent work is indicated in figure 11.

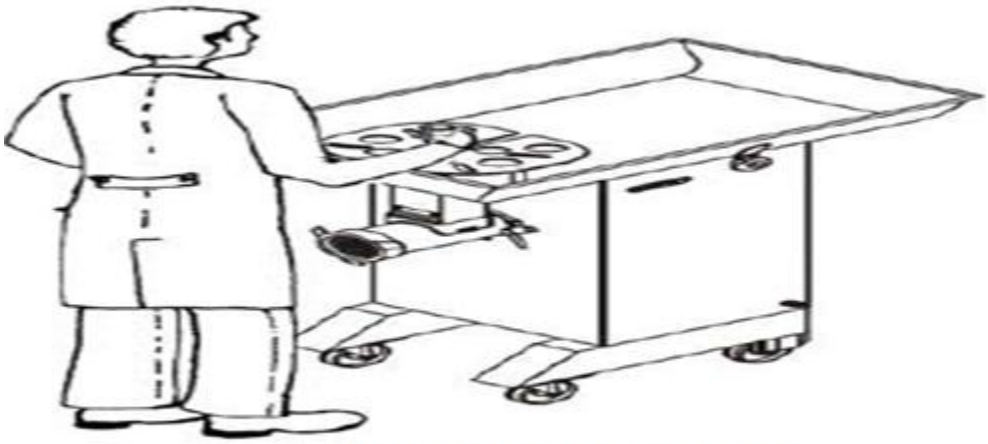


Figure 11: Working position

2.3.3 Technical features

Main parts this is a list of all the main parts of the machine illustrated in fig to make this manual easier to understand.

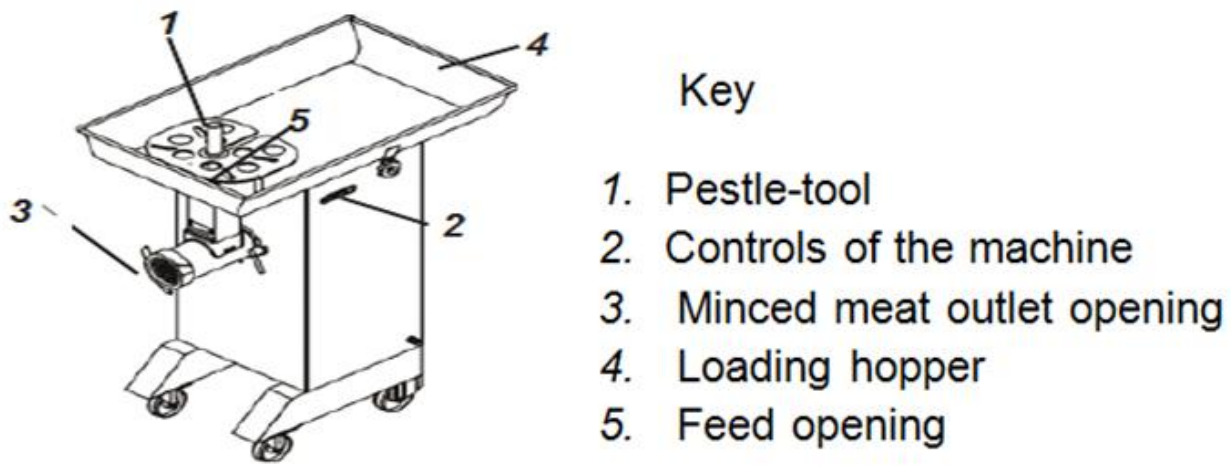


Figure 12: main parts of the machine

Table 6: Technical data

Mincer	Motor	Power source	TC Output/h	Standard plate
	watt/hp		kg/h.	ø mm
TC 32 HP	3000/4	230-400V/60Hz	700	4,5
TC 42 HP	3680/5	230-400V/60Hz	800-1000	4,5
TC 42 HP	5250/7	230-400V/60Hz	1200-1800	4,5

2.4.4 Dimensions and weight of the machine

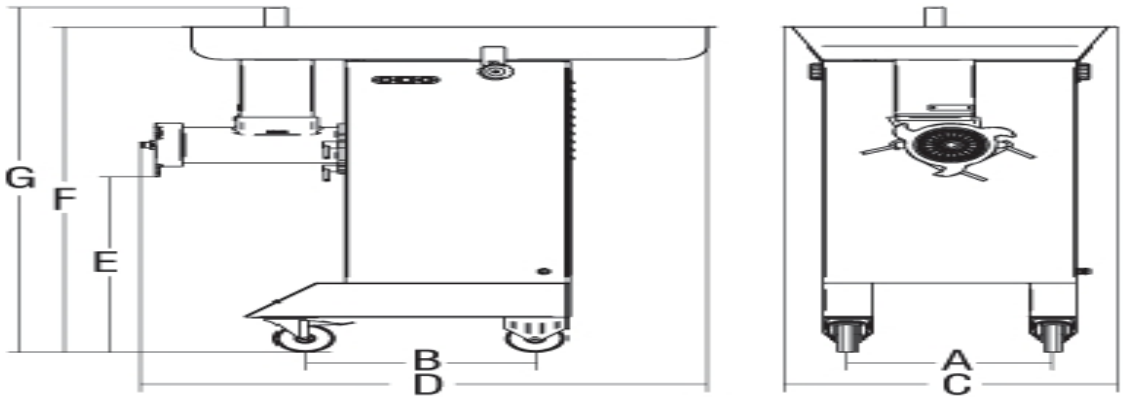


Figure 11: Dimensions and weight of the machine

Table 7: Dimensions and weight of the machine data

Mincer	A	B	C	D	E	F	G	Net weigh
	Mm	Mm	Mm	mm	Mm	mm	mm	Kg
TC 32 HP	348	393	564	911/102	230	1170	1240	90
TC 42 Hp	348	393	564	973/102	180	1170	1240	112
TC 42 Hp	348	393	564	973/102	180	1170	1240	112

2.4.5 Noise level

The measurement of the noise level indicates that the value is lower than 70 dBA.

On demand, the manufacturer can provide a copy of the noise level test.

2.4.6 Electrical circuit

Single-phase electrical circuit diagram 220/60 TC 32 –42

Three-phase electrical circuit diagram 220/60 TC 32-42 micro MOS-210

2.5. Use of the mincer

- Make sure the feeding tension corresponds to the value reported on technical plate.
- Lightly tighten the ring nut on the meat mincer and put in a little meat, press the start pushbutton, making sure that the rotation direction of the propeller is counter-clockwise.
- If the meat coming out is cut well then the nut has been sufficiently regulated; on the contrary, tighten the nut some more until reaching the perfect cut of the meat.
- Stop the machine by pushing the stop pushbutton.
- Remove collar ring. This operation does not require the use of additional tools (just your hands). Unscrew nuts
- After thoroughly cleaning, first assemble the mouth and block it; these operations are necessary to assure that the machine runs correctly.
- Now the propeller, the blade, the plate, and the nut can be reassembled.

2.6. How to Assemble a Meat mincer

When assembling your meat mincer, be sure that all of the components are secured tightly. Additionally, some meat mincer s may have slightly different configurations depending on the brand, but most meat mincers will follow this general order of assembly:

Step1. Before you assemble your meat mincer, you should wash, rinse, and sanitize all of the parts. After washing, let the pieces air dry.

Step 2.Check to ensure that the power cord is disconnected before assembly.

Step 3.Place the T link into the enclosure on the front of your meat mincer. Tighten the T link into place with the locking screw.

Step 4.Insert the screw pushing bar into the T link. Rotate the bar and make sure it's all the way into the back.

Step5. Add the four leaf blade onto the screw pushing bar with the flat side facing out.

Step 6.Place the round knife on the end of the screw pushing bar. Make sure the edges of the knife are flush with the edges of the screw pushing bar.

Step 7.Attach the four leaf handle cap to the T link and tighten.

Step 8.Add the stainless steel square plate or food pan to the top of the T link and you're ready to start grinding.

2.7. Procedures for meat mincer

Once you've assembled your meat mincer, you can begin using it. Here's how you can mincemeat in 7 easy steps:

Step 1.Remove skin, bones, fats and silver skin from your meat. Cut it into smaller chunks that will fit into the feeding hole.

Step 2.Use the feeding bar to feed meat into the mincer.

Step 3.Place a bowl or pan beneath the blades to catch the ground meat when it falls out.

Step 4.When you're finished grinding meat, disconnect the power cord.

Step 5.Wash, rinse, and sanitize all of the components. Then, let them air dry.

Step 6. Thoroughly clean the machine body with a damp cleaning and sanitizing cloth.

Step 7.Lubricate the oil seal of the gearbox through the screw hole. You should lubricate your meat grinder every six months or so.

Self-Check – 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

1. …. is a machine which cuts meat into very small pieces by forcing it through very small holes

A. tenderiser B. Jaccard 48 blades C. mincer

2. Which one of the following best mincer?

A.electric B. Jaccard 544 blades C. manual

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Information Sheet 3- Monitoring input and output

3. 1 .Introduction

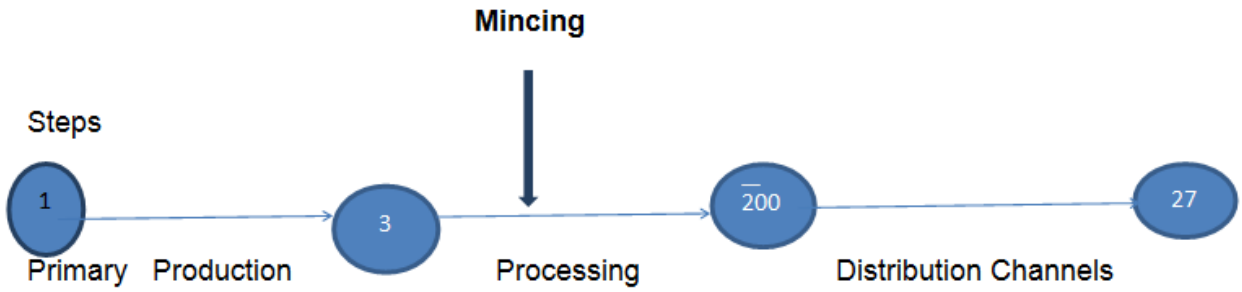
General control measures including those identified in the Code of Hygienic Practice for Meat (CAC/RCP 58-2005) should be implemented to prevent the contamination or cross-contamination of carcasses throughout the slaughter process.

3.2. Take control measures for process flow

During mincing Control measures that may have particular impact on the control of Salmonella include:

- Equipment and the environment should be kept clean and disinfected as required.
- Cleaning and disinfection procedures should be employed regularly and performed in a manner to prevent spread of pathogens.
- Water accumulation on the floor should be avoided and good floor drainage design should be ensured.
- Equipment should be maintained and designed to avoid contamination and build-up of organic material.
- Knives should be cleaned and disinfected between carcasses.
- Personnel should be trained both on operations and food safety aspects of slaughtering. The line speed should leave adequate time to perform all process steps in the operations.
- Proper employee hygiene practices should be maintained to prevent the creation of unsanitary conditions (e.g. touching product with soiled hands, tools, or garments). Hygiene should include the washing of hands to prevent cross-contamination.
- Water used for decontamination or cleaning and disinfection of equipment should be potable. In steps prior to stunning clean water may be used.
- Personnel health/ check every 6 months/.

3.2.1 Availability of control measures at specific process flow step



N.B. Refer to diagram '1' Lo1, information sheet '4' Page:

- Products should be stored at temperatures to prevent the growth of Salmonella.
- Equipment used for this operation should be adequately maintained and adjusted.
- In order to avoid cross-contamination, equipment and environment should be cleaned on a regular basis and good personal hygiene practices should be followed by employees.
- Processes such as grinding/mincing, may potentially spread contamination in the meat. There should be increased awareness when handling of the meat throughout the rest of the food chain.
- If equipment is used to process meat of a different risk profile (e.g. adult beef vs. veal) the equipment should be cleaned when changing from higher risk product to lower risk products. Alternatively lower risk product should be processed first.

3.2.2. Hazard-based control measures

- Chemical washes, such as lactic acid and peroxyacetic acid, have been shown to reduce Salmonella concentration.

Self-Check – 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

1. Discus control measures during mincing ./5 points /
2. List at specific process flow steps of mincing./7points/

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Operation Sheet 1- Operating manual meat mincer

Procedures for operating manual meat mincer

1. Wear proper PPE
2. Prepare all appropriate equipment's
3. Identify type of meat that is tenderized/beef/
4. Use the feeding bar to feed meat into the mincer.
5. Hold the handle and rotate it until minced firmly
6. cleaning the grinder/mincer /You may have cleaned all the parts /
7. dry and store properly

Operation Sheet 2- Operating industrial meat mincer

Procedures for operating industrial meat mincer

Step 1: Wear proper PPE

Step 2: Prepare all appropriate equipment's

Step 3: Identify type of meat that is tenderize/beef/

Step 4.Remove skin, bones, fats and silver skin from your meat. Cut it into smaller chunks that will fit into the feeding hole./10cm long 2 cm thick strip/

Step 5.Use the feeding bar to feed meat into the mincer.

Step 6.Place a bowl or pan beneath the blades to catch the ground meat when it falls out.

Step 7.When you're finished grinding meat, disconnect the power cord.

Step 8.Wash, rinse, and sanitize all of the components. Then, let them air dry.

Step 9.Thoroughly clean the machine body with a damp cleaning and sanitizing cloth.

Step 10.Lubricate the oil seal of the gearbox through the screw hole. You should lubricate your meat grinder every six months or so.

LAP TEST	Performance Test

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **3** hour. The project is expected from each student to do it.

Task-1 perform operating manual meat mincer

Task-2 perform operating industrial meat mincer

LG #29	LO #3- Maintain mincer

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Following mincer start-up procedures
- Performing routine maintenance and cleaning

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, **upon completion of this learning guide, you will be able to**:

- Follow mincer start-up procedures in accordance with work instructions.
- Perform Routine maintenance and cleaning in accordance with work instructions.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
3. Accomplish the “Self-checks” which are placed following all information sheets.
4. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
5. If you earned a satisfactory evaluation proceed to “Operation sheets
6. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
7. If your performance is satisfactory proceed to the next learning guide,
8. If your performance is unsatisfactory, see your trainer for further instruction.

Information Sheet 1- Following mincer start-up procedures

1.1 Introduction

The necessary tools and materials required for the machine set-up is gathered by following an operator performing the machine set-up. Analysis of the current situation, activities which can be done before the set-up process are listed and a layout is designed for the pre-setup process and an experienced person is trained to collect all the tools and equipment's required for performing the setup and start up process.

1.2 Start and stop

1.2.1 Check the electrical connection

- Connect the plug to the power supply;
- Press the on push-button ("1" Figure. 14a), and check the rotation sense of the tools (for the three-phase model 380).
- The rotation sense of the propeller screw must be anticlockwise.
- If the rotation sense is not correct, disconnect the machine from the power supply and call the after-sale service.
- Note: For the machines connected to a single-phase line, the rotation sense is set by the manufacturer.

1.2 .2 Check the presence and efficiency of the protections and safety devices

- Product exit opening.
  - ✓ Check that the diameter of the holes of the product exit opening is smaller than 8 mm. If it is not, the user must install an adequate protection on the opening.
- Hands protection
  - ✓ The hopper must be equipped with hand protection.
- Stainless steel hopper.
  - ✓ The stainless steel hopper must be fixed correctly to the structure.

1.2.3 Check the functioning of the stop push-button (figure 14a – 14b)

Connect the machine to the power supply and make it work:

- Then press the stop push-button “0” figure 14a. The machine has to stop.
- Turn the switch to "0" position figure 14b. The machine has to stop

1.3 Startup of the machine (figure 14a – 14b)

1.3.1 Steel controls

To start the machine, connect the plug in the power supply outlet and press push-button “On” “1” figure 14a and the machine starts

1.3.2 Switch

To start the machine just turn the switch to “1” figure 14b, after having correctly connected the plug to the electrical outlet and the machine will start.

1.3.3. Stopping the machine

Switch to stop the machine just turn the switch to "0" figure 14b and the machine will stop.

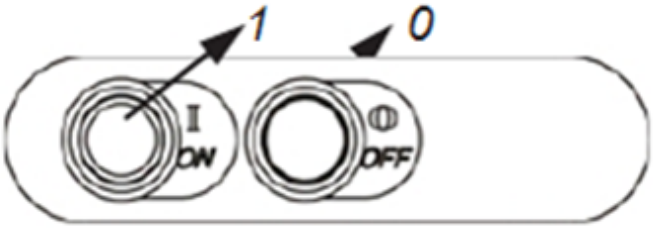


Figure 14 a: Startup of the machine

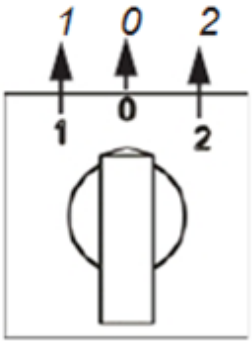


Figure 14 b : Startup of the machine

Self-Check – 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

1. Discus mincer start up procedures./5 points /
2. What is the function of the switch-button?

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

You can ask you teacher for the copy of the correct answers.

2.1 Introduction

Machine maintenance is the work that keeps mechanical assets running with minimal down time. It can include regularly scheduled service, routine checks, and both scheduled and emergency repairs. It also includes replacement or realignment of parts that are worn, damaged, or misaligned.

Establishments, facilities and equipment should be kept in an appropriate state of repair and condition to facilitate all sanitation procedures and prevent contamination of meat, e.g., from metal shards, flaking plaster and chemical contaminants. Sanitation standard operating procedures (SSOPs) should specify the scope of the cleaning program, cleaning specifications, persons responsible and monitoring and record keeping requirements.

2.2. Maintenance, tips And Warnings manual mincer

2.2.1 Tip

- After using the grinder, cleaning is paramount. To make it easy to clean your grinder, use dry bread crusts to get rid of remaining meat pieces. The bread will be able to get deep into the grinder where your hands can't.

2.2.2 Warnings

- Grinding plates are extremely sharp. Handle them with care
- Be careful when putting pieces of meat into the grinder. Injuries could result if your fingers get into the grinder.
- Do not use a tool to push meat or food into the grinder. This is to avoid damaging the grinder. The screw pieces action is enough to draw the meat or food down into the grinder. All that is required of you is turn the handle and all will flow smoothly. Take care of your grinder for it to last for many years.
- Keep hands and arms well clear of rotating wheel (if you have long hair, make sure it is tied back and will not touch the rotating wheel).

- Gently feed the stock into the wheel, do not force it. Move it side-to-side to avoid a hot spot on the wheel
- Maintain good balance (stand erect with both feet straight and slightly apart) while grinding your stock. Avoid leaning into the machine or stooping over the wheel.
- You should keep your meat grinder in the freezer for hours to avoid the excessive heat during grinding.
- Cut the meats well to avoid any possibility of being blocked.
- Sharpen your blades whenever required to improve the performance and to make the process less time-consuming.
- Clean you meat grinder manually. The dishwasher might damage some metal parts.

2.2.3. When done

- Perform these steps only after the equipment has been turned off, and the wheel has stopped turning.
- Clean up the shaving debris by using a brush or the shop vacuum to avoid potential splinters from the shavings.

2.2.4 If repairs are necessary

If odd noise, excessive vibration, or if an unsafe condition is observed:

- Turn machine off.
- Unplug machine and install “Plug Lockout” device (give key to the teacher or respective person) and install the “Tag out” label.
- Do not repair it yourself.
- Notify to your teacher, giving a description of what happened and your contact information.

2.2.4 Accident procedures

- Administer proper First Aid; a kit is available in the specified work shop or room.
- Call or if using Cell Phone for emergency assistance.

- Seek medical help from Employee Health Services, or Student Health, or Hospital (no need to phone them before going).

NOTE: Please refer the specific operating procedures and machine set up from the 'Lo2' information sheet '2' and 'Lo3' information sheet '1.'

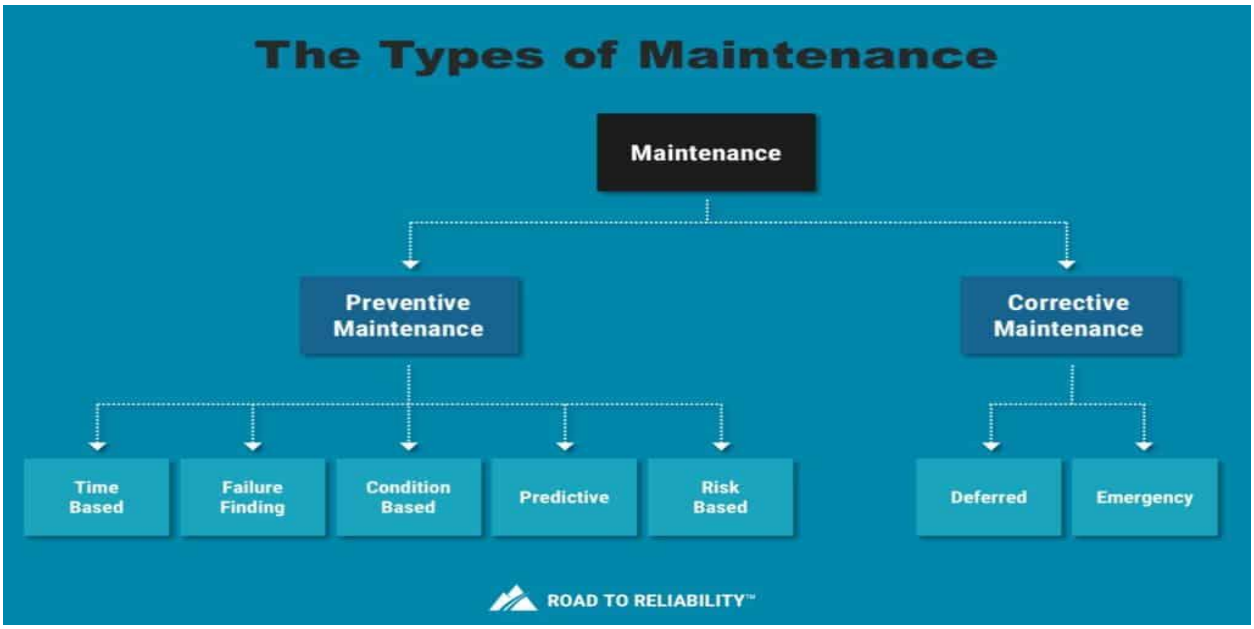
2.3. Maintenance, tips And Warnings industrial electric mincer

- Any maintenance or cleaning operation of the mincer must be performed only if the machine is disconnected from the power supply.
- The area where you perform maintenance operations must always be clean and dry.
- Do not let unauthorized personnel to intervene on the machine.
- Any parts, including the tool must be substituted by original spare parts.

2.3.1 Type of maintenance

There are two type of maintenance as shown the diagram bellow.

Diagram 2: type of maintenance



2.3.1.1 Preventive Maintenance

Preventive maintenance can be defined as “an equipment maintenance strategy based on replacing, or restoring, an asset at a fixed interval regardless of its condition. Scheduled restoration tasks and replacement tasks are examples of preventive maintenance tasks.

Preventive maintenance (or preventative maintenance) is basically a type of maintenance that is done at a regular interval while the equipment is still functioning with the objective of:

A. Reduce critical equipment breakdown.
B. Minimize production loss due to equipment failures.

Apart from the regular interval approach (time based maintenance) there are also other types of maintenance that fall within the category of preventive maintenance:

- Time-Based Maintenance: refers to replacing or renewing an item to restore its reliability at a fixed time, interval or usage regardless of its condition.
- Failure Finding Maintenance tasks are aimed at detecting hidden failures typically associated with protective functions.
- Risk Based Maintenance (RBM) is when you use a risk assessment methodology to assign your scarce maintenance resources to those assets that carry the most risk in case of a failure (remembering that risk = likelihood x consequence).
- Condition Based Maintenance (CBM) most failure modes are not age related. However, most failure modes do give some sort of warning that they are in the process of occurring or are about to occur.
- CBM as a strategy therefore looks for physical evidence that a failure is occurring or is about to occur. Thinking of CBM in this way shows its broader applications outside condition monitoring techniques often only associated with rotating equipment.
- Predictive Maintenance as an extension, a more advanced approach to CBM where we use potentially many process parameters gained from online sensors to

determine if our equipment is moving away from stable operating conditions and is heading towards failure.

2.3.1.2 Corrective Maintenance (CM)

A Run to Failure or Corrective Maintenance strategy only restores the function of an item after it has been allowed to fail. It is based on the assumption that the failure is acceptable (i.e. no significant impact on safety or the environment) and preventing failure is either not economical or not possible.

- Emergency Maintenance is corrective maintenance that is so urgent that it breaks into your Frozen Weekly Schedule.

2.3.2 Lubrication

The machine requires lubrication every 6 month based on the manual.

Table 8: Problems, causes, solutions

Problems	Causes	Solutions
The machine does not start	- The differential switch is on Position “0”.	- Turn the switch to position “I”
	- The outlet switch is on position "0"	- Turn the switch to position “I”
	- The push-button “on” does not work.	- Call the technical service center
	- The machine is not correctly installed with all protections and safety devices efficient and correctly fitted	- Control all protections and safety devices
- The screw propeller does not turn in the sense indicated by	The motor wires are inverted	Call the technical service center (dealer).

the arrow (on three-phases model)		
- The product is not minced correctly	The plate and the knife are not tightened correctly - There is some rust on the plate and knife, they do not stick perfectly to each other (on the surface of the plate) - The feed opening is not installed correctly	Tighten correctly the plates and knife - Replace the faulty plate and knife - Fix correctly the feeding Opening

2.3.3. Cleaning of the machine

Cleaning procedures and programs should:

- be specified in SSOPs as appropriate to the circumstances;
- provide for removal and storage of waste;
- ensure that there is no consequential contamination of meat with detergents or sanitizing agents, unless allowable under conditions of use; and
- Be monitored for their effectiveness, e.g., organoleptic checks and microbiological sampling of meat contact surfaces, and be redesigned if and when necessary.

Particular cleaning programs are required for equipment used in the slaughter and dressing of carcasses e.g., knives, saws, machine cutters, evisceration machines and flushing nozzles. Such equipment should be:

- clean and sanitized before each new period of work;
- Cleaned, and sanitized, by immersion in hot water or alternative methods, with appropriate frequency during and/or between periods.
- Containers and equipment should not pass from an “inedible” area to an “edible” area before being cleaned and sanitized.

- Pest control programs are an essential part of maintenance and sanitation and should follow GHP as described in the Recommended International Code of Practice: General Principles of Food Hygiene.
- Before cleaning the machine, disconnect it from the power supply.
- Never clean the machine with a water jet.
- It is compulsory to use a toxic detergents, in respect with food hygiene regulation
- The appliance clean must be cleaned at least once a day or if necessary more than once.
- Scrupulously clean all the various components come in direct contact with the food product or not.
- Never clean with a pressurized water-jet, industrial cleaner, and brushes or any other type of cleaning utensil that could damage the surface of the appliance.
- Before cleaning you must remove the electricity supply plug isolating the appliance from the main power circuit.
- Procedure to follow for cleaning
  - ✓ Remove the pestle and food tray; unscrew the lock nut and remove the disk blade, screw feeder, unscrew the knob and remove the mincer.
  - ✓ Now all the components can be washed using warm water (50 ℃) and a neutral detergent.
  - ✓ To clean the main structure use a damp cloth remembers to frequently rinse.
  - ✓ The grater roller mounted should be brushed. Carefully clean the punched holes.
  - ✓ Make sure all the components are completely dry before remounting them.

Self-Check – 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

1. Define the following terms maintenance
2. Discus about type of maintenance

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**
You can ask you teacher for the copy of the correct answers.

Operation sheet 1– Procedures for cleaning of mincer machine

Steps / procedures for cleaning of mincer machine

1. Wear proper PPE
2. Select cleaning equipment's and appropriate detergent.
3. Disconnect electric power
4. Remove the pestle and food tray; unscrew the lock nut and remove the disk blade, screw feeder, unscrew the knob and remove the mincer
5. Now all the components can be washed using warm water (50 ℃) and a neutral detergent.
6. To clean the main structure use a damp cloth remember to frequently rinse
7. The grater roller mounted should be brushed. Carefully clean the punched holes.
8. Make sure all the components are completely dry before remounting them.

LAP TEST	Performance Test

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **1:30** hour. The project is expected from each student to do it.

Task-1 Perform cleaning of mincer machine

Reference Materials

Book:

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13. Adanna, I. W. & Shantharam, A., 2013.Improvement of Setup Time and Production Output with the use of Single Minute Exchange of Die Principles (SMED). International Journal of Engineering Research, 2(4), pp. 274-277

WEB ADDRESSES

1. http://www.who.int/foodsafety/consumer/5keys/en/ Food: facts and principles N. Shakuntala O. Manayhttp://www.aps.uoguelph.ca/~swat land/ch9_2.htm
2. / https://www.youtube.com/watch?v=mKUramIayYw

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Key Answer for Self check Questions LG # 27-29

LG-27

Self-check 1

1. B
2. D
3. C
4. Natural: ageing

   Artificial

   - ✓ Mechanical
   - ✓ Chemical
   - ✓ Electrical simulation

5. The operating and maintenance staff must be completely trained on how to operate and maintain this machine.

✓ The machine is not to be operated by any persons who are unauthorized, untrained, or under the legal age according to local regulations.

✓ Do not operate this machine when impaired or under the influence of drugs or alcohol.

✓ Do not use the machine for any functions besides those indicated in these operating instructions.

✓ If you cannot fix an issue yourself, inform maintenance and/or your after-sales service.

Self-check 2

1. A **2. A**

Self-check 3

1. Products should be stored at temperatures to prevent the growth of Salmonella.

- Equipment used for this operation should be adequately maintained and adjusted.
- In order to avoid cross-contamination, equipment and environment should be cleaned on a regular basis and good personal hygiene practices should be followed by employees.

- Processes such as mechanical tenderization may potentially increase contamination in the meat. There should be increased awareness when handling of the meat throughout the rest of the food chain
- Transport, ageing, receiving, finished product fabrication, tenderization, and distribution.

LG -28

Self-check 1.

1. Don't fool around. "Horseplay" is one of the biggest causes of injuries on the job and it may be grounds for dismissal.

- Never work while under the influence of drugs or alcohol, as you are a hazard to yourself and your co-workers.
- Pay particular attention to moving objects, such as equipment, dollies, mixers, and slicers.
- Walk does not run, in the work areas.
- Stay completely alert on the job.
- Avoid back strain by lifting properly.

2. Understand the correct operating procedures and safety precautions before operating a piece of equipment.

- Ensure that all guards are in place and functioning before any machine is started.
- Report defective or unsafe equipment to a responsible individual to prevent serious injury.
- Do not distract or interfere with the equipment operator.
- Make sure that the cords to electrically powered tools are in good condition, with no frayed parts or bare wires showing and make sure that the tools are properly grounded.
- Keep edge-cutting tools properly sharpened so that they do the job well and do not have to be forced because of dull edges.
- Use tools only for their intended use and make sure the size of the tool is right for the job.

- Report to your immediate supervisor any tool or piece of equipment that is broken or does not function properly

3. Shut off mincer at stop/start switch.

- Shut off at disconnect behind mixer.
- Apply lock to disconnect. Put key in pocket. Do not leave key in lock!
- Attempt to start miner, reset or return switch to “off” position.
- Complete work on miner.
- Ensure bowl and mincer are clear of loose pieces, tools, etc.
- Remove lock.
- Restart mixer and run up to operating speed.

4. Keep the floor, avoid burn, shut down practice, avoid cut, avoid fall etc.
5. Electric , water

Self-check 1.

1.C **2. A**

Self-check 2.

1. Products should be stored at temperatures to prevent the growth of Salmonella.

- Equipment used for this operation should be adequately maintained and adjusted.
- In order to avoid cross-contamination, equipment and environment should be cleaned on a regular basis and good personal hygiene practices should be followed by employees.

- Processes such as grinding/mincing, may potentially spread contamination in the meat. There should be increased awareness when handling of the meat throughout the rest of the food chain.

- If equipment is used to process meat of a different risk profile (e.g. adult beef vs. veal) the equipment should be cleaned

2. Layriage	Boning	Pre chill
Stunning	Brisket opening	Chill
Shackling	Rodding	Carcass fabrication
Sticking/bleeding	Evisaration	Mincing
Dehiding	Splitting	Packaging and storage
Head removal	Post mortem	

LG -29

Self-check 1.

1. Connect the plug to the power supply;

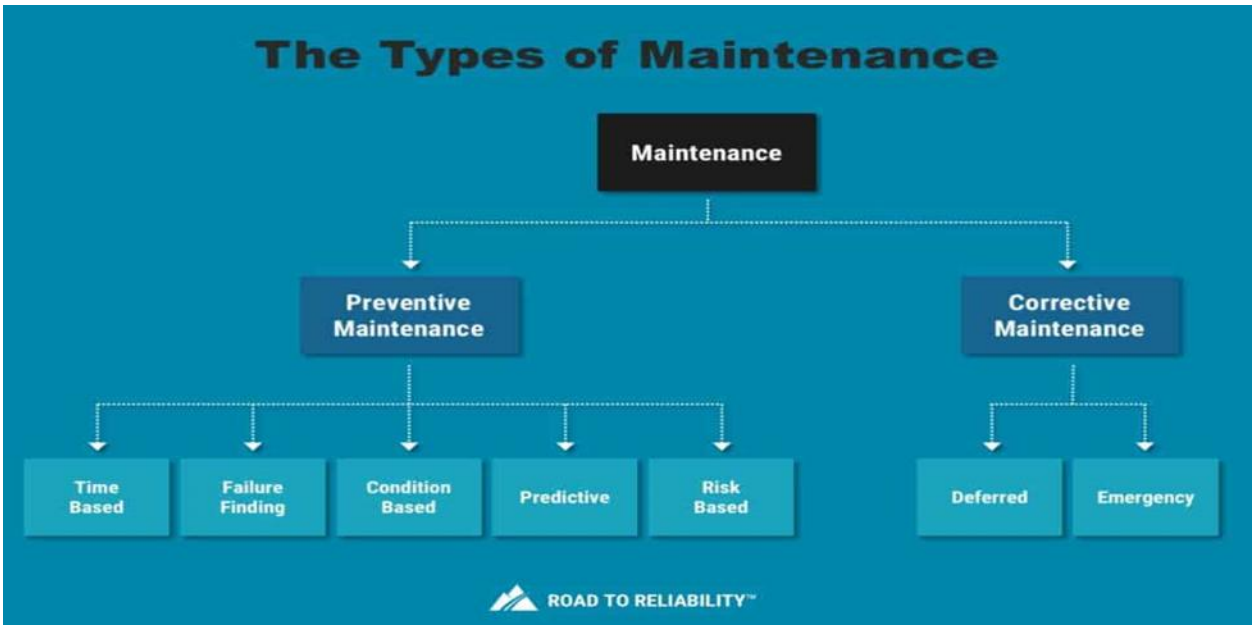
- Press the on push-button (“1” Figure. 14a), and check the rotation sense of the tools (for the three-phase model 380).
- The rotation sense of the propeller screw must be anticlockwise.
- If the rotation sense is not correct, disconnect the machine from the power supply and call the after-sale service.
- Note: For the machines connected to a single-phase line, the rotation sense is set by the manufacturer.

2. on and off

Self-check 1.

1. Machine maintenance is the work that keeps mechanical assets running with minimal down time. It can include regularly scheduled service, routine checks, and both scheduled and emergency repairs. It also includes replacement or realignment of parts that are worn, damaged, or misaligned.

2.


The Types of Maintenance
Maintenance
Preventive Maintenance
Corrective Maintenance
Time Based
Failure Finding
Condition Based
Predictive
Risk Based
Deferred
Emergency
ROAD TO RELIABILITY™