# Meat and meat products processing

## Level-III

## Based on May 2019, Version 2 Occupational standards

## Module Title: - Preparing and Filling Casing

## LG Code: IND MPP2 M11 LO (1-4) LG (38-41)

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**Instruction sheet**

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

- Identifying casings
- Selecting casings to suit product
- Checking casings for faults
- Calibrating casings according to product specifications
- Preparing casings
- Flushing casings thoroughly with cleaning water
- Spooling casings or pulling into filling tube or nozzle in preparation for further processing
- Preparing correct quantity of casings
- Preparing casings according to Occupational Health and Safety (OHS), and hygiene and sanitation
- Storing casings according to manufacturer specifications and hygiene

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:

- Identify casings
- Select casings to suit product
- Check casings for faults
- Calibrate casings according to product specifications
- Prepare casings
- Flush casings thoroughly with cleaning water
- Spool casings or pulling into filling tube or nozzle in preparation for further
- processing
- Prepare correct quantity of casings

- Prepare casings according to Occupational Health and Safety (OHS), and hygiene and sanitation
- Store casings according to manufacturer specifications and hygiene

**Learning Instructions:**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”.
4. Try to understand what are being discussed.
5. Ask your trainer for assistance if you have hard time understanding them.
6. Accomplish the “Self-checks” which are placed following all information sheets.
7. 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).
8. If you earned a satisfactory evaluation proceed to “Operation sheets
9. Perform “the Learning activity performance test” which is placed following “Operation sheets”
10. If your performance is satisfactory proceed to the next learning guide,
11. If your performance is unsatisfactory, see your trainer instructions or go back to “Operation sheets

## Information sheet 1: Identifying casings

### 1.1 Introduction

Casings are soft cylindrical containers used to contain sausage mixes. simply casing, is the material that encloses the filling of a sausage.

Casings can be of natural origin or artificial. Natural casings are obtained from animal intestines derived from slaughtering. Manufactured artificial casings are made of cellulose, collagen or synthetic materials. Sausage fillings are mostly minced or comminuted meat mixes held together by the casings during further processing steps such as smoking, boiling, frying or roasting. In addition, casings also protect products during storage.

### 1.2 Casing specification

Casing has specified based customer needs and requirements. Specifying casing may depend on the following criterion

#### 1.2.1 Color and size

The average length of the small intestine from sheep is 17 to 24 meters depending on the size of the animal. Sheep and goat casings for the international casing trade are produced in largely mechanized operations, usually packed in hanks (91.4m or 100 yards) and graded according to their diameter and color coded as follows:

- 28/ + mm green/white 26/28 mm green
- 24/26 mm red/white 22/24 mm red
- 20/22 mm blue/white 18/20 mm blue
- 16/18 mm yellow/white 14/16 mm yellow

Sheep casings, as well as other natural casings are soaked in water before filling the sausage mix. This treatment removes part of the salt and the casing walls become more elastic, as their collagen fibers absorb water. Addition of organic acids, in particular lactic acid (2% to the water), also assists in this process.

Fig. 1. Variety of casing

### 1.2.2 Casing type

#### 1.2.2.1 Natural

Natural casings are mainly derived from small and large intestines from sheep, goats and pigs, but also from cattle and horses.

They are strong enough to resist the pressure produced by filling them with sausage mix

- They are permeable to water vapor and gases, thus allowing fillings to dry1
- They absorb smoke for additional flavor and preservation
- They expand or shrink firmly attached to the sausage mix and
- They can be closed at the ends by tying or clipping.

Small intestines of sheep, goats and pigs are popular small caliber natural A casings. Many other parts of the intestinal tract of slaughter animals can also be used for natural casings. Those casings are processed differently and have stronger and tougher casing walls. Due to their toughness, they are generally not considered “edible” (although not unfit for human consumption) and are usually peeled off before consuming the sausages.

In many parts of the world the proper manufacture of sausage casings from animal intestines is unknown. Intestines, if not used for human food, are often wasted.

Many people in the livestock and meat sector are unaware that processing of intestines into natural casings for sausage production is relatively simple and can be a profitable1 business.

If natural casings can be produced locally, this may help to reduce overall production costs. Even in remote or rural settings with no access to commercial casing suppliers, natural casings can easily be processed from intestines derived from local slaughter.

The availability of locally produced natural casings will considerably facilitate rural meat processing but proper advice and training on casing preparation is essential. There is no point in freezing sausage casings if you are going to use them again in a week or two. Throwing them in a fridge is better for shorter periods of time.

#### 1.2.2.1.1 Natural Casing Badness

Natural casings themselves, even when fresh. Have a strong distinct odor that isn't pleasant. Sheep casings smell differently than hog and so on. This does not mean they are spoiled. Sheep casings are also noted to have a stronger smell than the others. One way to tell is the smell they will have. Since fresh ones stink anyways. You need to be able to notice if the smell has changed. Spoiled casings will have a rancid and sour smell to them.

### 1.2.2.2 Synthetic (Artificial manufactured) casings

Artificial casings were developed at the beginning of the 20th century when, in some countries, the supply of natural casings could no longer cope with the demand for such natural casings from the growing meat industries. Following the development of highly automated sausage filling equipment, artificial casings proved to be better suited to those systems, mainly due to their uniformity.

Also, from the hygienic point of view, there were certain advantages to artificial casings as the microbial contamination are negligible, refrigeration is not needed and there are no spoilage problems during transport and storage. Nowadays, for wide sausage calibers, artificial casings are the material of choice, while for smaller caliber products, artificial and natural casings remain equally important.

## ARTIFICIAL CASINGS

**Figure 2. Artificial casing**

According to their structure and composition of material1, artificial casings can be subdivided into

I) casings made of natural materials, with two groups:

a) casings made of organic plant material, namely cellulose

b) casings made of animal by-products, namely collagen

II) casings made of synthetic substances deriving from thermoplastic materials ("synthetic casings" which can be subdivided in "polymer casings" and "plastic casings").

**I) Casings Made of Natural Materials, With Two Groups**

**A. Cellulose casings**

Cellulose as a natural material derived from wood or cotton has proven to be suitable for sausage casings as it is: mechanically resistant widens when soaked in water and shrinks when dried (which exactly meets the requirements for a tight and smooth casing without formation of wrinkles on the sausage surface) permeable for gases, smoke and water vapor.

As a further step in the development of strong fibrous casings for large calibers, a layer of synthetic material, (e.g., PVDC) was added to the inside or outside of the casings (coated fibrous casings). The coating made the casing mechanically very resistant and created a complete barrier for gases, i.e., no evaporation losses can occur.

However, fibrous casings with an inside or outside synthetic coating cannot be used for products to be smoked, as no smoke penetration is possible, and for products to be dried and

fermented, as no water vapor evaporation is possible. They are mainly used for cooked sausages of the raw-cooked and the precooked-cooked type.

The main advantage of coated fibrous casings for cooked sausages is the casing wall tightly enclosing the sausage mix and the easy peeling. As smoke does not penetrate through coated fibrous casings, smoke flavor can be added during manufacture of the sausage mix if desired.

**Figure 3. cellulose casing**

**B. Fibrous Casings**

Fibrous casings are casings suitable for smoked sausages, cooked sausages, dried sausage types and ham products. Silo supplies fibrous casings that are made from cellulose and are reinforced with a fibrous membrane. It is possible to supply these fibrous casings with a coating on the inside so it can be easily removed (easy peel).

**Figure 4. fibrous casing**

**C. Collagen Casing**

Collagen is a common, naturally occurring, long, fibrous protein with remarkable properties. It has been used for many years as the primary raw material for various applications, including in the biomedical and cosmetic fields as well as in the food and nutraceutical industry. It is also the base material for the extensive gelatin industry.

Collagen is uniquely suited for the manufacture of edible casings. As a result of its unique fibrous nature, it provides the high mechanical strength required for very thin casings to survive the forces of high-speed machines in the sausage stuffing and linking process. Collagen is also unique in that it will shrink on heating at about the same rate as meat, while moisture and fat melt away, reducing the sausage diameter. No other edible material has been found to provide these unique characteristics.

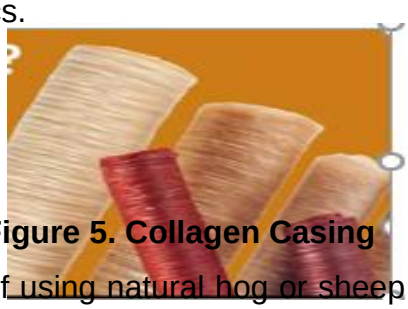

**Figure 5. Collagen Casing**

Collagen Casings take the place of using natural hog or sheep casings. They can be used for fresh or smoked sausages. They are made from beef protein. There is no preparation necessary. Just put them on your stuffing tube and before you know it you will have uniformly sized sausages! The 21mm size are great for breakfast sausages.

**Benefits of Collagen Casings**

- **Traceability/Safety**

When using collagen casings, there is no need to worry about these issues. Collagen casings are made from safe materials and the collagen extraction methods used make the casings totally free from all health risks.

- **Superior Productivity**

Edible collagen casings provide a superior yield based on ready-to-stuff materials, longer shirred lengths and high-speed stuffing capabilities. Rework is minimized via consistent strand length and size control.

- **Ease of Use**

Edible collagen casings are ready to use straight from the box and horn loading is quick and easy. Reliable, consistent supply and availability are realities.

- **Lower Production Costs**

Edible collagen casings do not need to be stored in a "chilled" environment and they are easy to use with no possibility of product losses prior to stuffing. The processor can count on lower production costs with better productivity, production standardization (at all levels), and less labor. The added benefit of longer shelf-life is also a key competitive advantage for sausages made in collagen casings.

- **Consistent Size Control**

Customers can count on consistent diameter products and constant sausage length, making packaging quicker and easier, with reduced "give-away".

- **General Acceptance**

Collagen casings have a pleasant, neutral scent and are ready to use straight from the package. There is no messy preparation time (soaking and untangling of bundles) required. Pricing and supply are much more stable making costs predictable - in addition to there being no seasonal variations. Sausages manufactured in collagen casing allow for all round cooking coverage which delivers a superior cooked appearance when compared to sausages in natural casings.

**II) Synthetic casings**

These casings are made of synthetic thermoplastic materials Suitable materials are Polyamide (PA), Polyethylene (PE), Polypropylene (PP), Poly vinylidene chloride (PVDC) and Polyester (PET). While previously only synthetic casings from individual synthetic substances (mono-materials) could be fabricated, recently developed coextrusion1 techniques can be used to produce casings composed of combinations of several synthetic materials. Synthetic casings can therefore be manufactured with tailor-made properties. The resulting casings are mechanically strong, relatively heat resistant, impermeable for smoke, gases and water vapor.

Synthetic casings are particularly well suited for:

- Sausages with larger caliber
- Sausages where water vapor losses are not wanted
- Sausages to be cooked at relatively high temperatures
- Sausage ends to be clipped
- Sausages with long shelf life and good preservation of taste and flavor (prevention of rancidity, discoloration, flavor losses)

The latest development in synthetic casings are casing walls consisting of two to five layers of synthetic material with extreme barrier properties for gases and temperature resistance from -18° to 105/121°C They are suitable for production of sausages with long shelf life as they can be mildly sterilized and stored frozen if necessary. Synthetic casings cannot be used for products which have to undergo drying, ripening and fermentation, such as dry sausages, as the casings are impermeable for gases and water vapor.

Preparing sausages casing after storing them involves washing off excess salt. Also, it important to re-hydrate them which is done by soaking them. Sometimes soaking them takes care of both jobs. Washing off enough salt and properly hydrating them before use.

How good you wash them depends on how they were preserved. If you used dry salt then you might need to soak them for a period of time.

**Self-check 1**

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 (3 point)

1. Casing is specified by the following things except one
   A. Color
   B. Size
   C. Nature
   D. Hygienist
2. Which are the Benefits of collagen casing?
   A. Traceability/Safety
   B. Ease of Use
   C. Lower Production Costs
   D. Consistent Size Control
   E. all

Test 2 short answer

1. what is synthetic casing made from?
2. What is the badness of natural casing?

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note:*** Satisfactory > 9 points Unsatisfactory - <10 points

## Information sheet 2 Selecting casings to suit product

### 2.1 Introduction

There are several choices to consider for casings, including natural, manufactured collagen, cellulose, fibrous and moisture proof casing materials. Each of these has its own unique characteristics and will impact product properties in different ways.

**Figure 6. different types of casing**

### 2.2 selection criterion

While selecting casing check the following features;

a. **Consistency –** Selecting low consistence is prefer to slushing product into casing. The product must can be run through it and not rough. While slushing it can simply pull to the nozzle.

b. **firmness -** High firmness and can resist tearing by pressure. The wall of casing must be uniform and strong**.**

c. **Shape –** the shape is designed according to product and manufacturer needs. All ways water tube for and smooth lined.

d. **thickness –** the thickness may be specified according to product weight and character to avoid split of product because of pressure. $^{o^{\circ}}$c

e. **Edible or -** Collagen" casings (manmade edible) are generally made from collagen derived from animal hides. Inedible casings are generally made from either cellulose or plastics.

f. **Inedible -** Ideal for the production of uncooked salami-type sausages (molded, a typical Italian product, or washed), semi-cured and boiled, available in straight versions in sizes ranging from 28mm to 140mm, and in curved versions in sizes ranging from 38mm to 52mm.

**Figure 7. Inedible collagen casing**

They meet all European legal standards for materials coming into contact with foodstuffs. They can be supplied in various formats to meet the customer's specific needs:

- in pieces pre-tied in various lengths ready for use with the option of customized binding (eyelet color on request, all colors available)
- shirred for continuous clipping machines (standard stick length, or on request)
- in pieces clipped to size
- in skeins or rolls
- sewn in any shape

These casings offer the following benefits:

- no stretch marks on the surface of the casing and perfectly uniform colour when cut

- rapid execution
- uniform material (no holes and uniform size)
- easy to peel away

### 2.2.1 Choosing the Right Sausage Casings

The sausage casing you select can greatly enhance your sausage making and eating experience. Sausage casings are available in various types and sizes. The four general categories of sausage casings are Natural Casings, Collagen Casings, Fibrous Casings, and Synthetic Casings.

A. **Collagen casing**

Collagen sausage casings are made from the gelatinous substance found in the connective tissue, bones and cartilage of all mammals. This is also the same substance used to make the famous gelatin dessert. Most commercially purchased sausage in the USA is stuffed into collagen casings.

Collagen casings are the complete solution for all sausage applications, including freezing, deep fat frying, grilling and oven cooking. Collagen casings are supplied on a shirred stick and the amount needed for each application can be cut off.

These casing are suitable for hand-linking provided the appropriate sausage mix and recipe are used. When hand-linking, the casing is dry, so we suggest using a vegetable oil to help with the process. Oil has the added benefits of leaving a lasting sheen on the sausage and helps with cooking. No soaking is required and they have an indefinite shelf life if stored in a cool dark place, refrigeration is not necessary.

B. **Fibrous**

Fibrous sausage casings are made from wood cellulose (essentially paper) permeated with protein. Fibrous casings are the toughest casings produced and are inedible. They are used where maximum uniformity of the finished product diameter, whether sausage or smoked meat, is desired. The uniformity of product stuffed in the casings make them ideal for slicing for prepackaging. These casings do not require refrigeration.

C. **Synthetic**

Synthetic sausage casings are made from alginates, and the casings themselves require no refrigeration. Synthetic casings are used by mass producers and can be made in different colors. They are the most uniform and strong of all types of casings.

**D. Moisture proof casings**

Several different kinds of materials including polyethylene, nylon and several others are used to manufacture moisture-proof casing that is frequently used for water-cooked or steam-cooked products.

**Figure 8. moisture proofing casing**

These casings are typically impermeable to both moisture and smoke, so smoke flavoring such as liquid smoke must be incorporated into the meat mixture. Color is incorporated into many of these casings such as those frequently used for Braunschweig.

Advantages to these casings include minimal cooking shrink for the product and a finished product that is very well protected from external contamination as long as the casing is intact.

**Self-check 2**

Name _____ ID: _____ Date _____

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

**Test 1: True OR False**

1. The sausage casing you select can greatly enhance your sausage making and eating experience
2. Collagen sausage casings are made from the gelatinous substance found in the connective tissue, bones and cartilage of all mammals.

**Test 2: Choice**

1. ____ is a character of casing enabling resist tearing by pressure and wall of casing must be uniform and strong.
    a. Firmness
    b. Consistency
    c. Thickness
    d. No answer
    1. All are the selection criterion of casing except
        a. Firmness
        b. Consistency
        c. Thickness
        d. Width

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

**Information sheet 3: Checking casings for faults**

***Note:*** Satisfactory > 9 points Unsatisfactory - <10 points

### 3.1 Introduction

Faults of casing may affect product quality and increase product defects. To control product and quality loss checking the fault may occur in case of casing material and preparation casing problem is mandatory before calibrating**.**

### 3.2 Consequence of Fault

The following consequence has dealt the fault leads the problem to operating and losing quality of product and their solution elaborate to redeemable products from impact. You can inspect the following consequences of casing to checking fault.

**i. Graying**

Problem: Oxidation causes sausage to change colors.

Solution: Use UV-filtered plastic overwrap on tray packs. A tinted collagen casing can keep fresh sausage looking pink longer. Use it on manufactured-style fresh sausage along with UV-blocking overwrap to increase sausage sales.

**ii. Cloudy Casings**

Problem: Cloudy appearance makes it more difficult to see fresh ingredients in sausage, which is unappealing to consumers.

Solution: Hog casings can vary in thickness and opacity, so buy casings with more clarity. Ask your Oversea Casing account executive for alternatives.

**iii. Threads of connective tissue, or whiskers**

Problem: Visible threads of fatty connective tissue, or whiskers, appear on inside curve of casing as a result of processing hog casing with a knife.

Solution: Try Oversea Casing's REAL™ brand hand pulled hog casings, which don't have threads, or Oversea Casing Fresh-Link™ casings that offer whisker-free appearance but added strength and long strands of a knife cut casing

**iv. Splitting Casings**

Problem: Sausage casings split open. Product exploitation to hazards.

Solution: Don't overstuff. Make sure stuffed circumference matches manufacturer's recommended measurements.

Dry casings until sweat is out, then smoked and finished in high humidity of at least 50%. Soak casings in 90º–100º F (32.2º-37.7º C) for 20–30 minutes and make sure water gets inside casings.

Check stuffing horn, clipper, stuffing table or racks in the smokehouse for burrs or nicks, which can cause splitting.

Use high-quality, fresh raw materials. High bacteria count in meat will explode the casing during cooking.

iv. **Wrinkling**

Problem: Casing looks wrinkled.

Solution: Do not under stuff. Make sure stuffed circumference matches manufacturer's recommended measurements.

Shower then hold casings at room temperature 30–60 minutes before placing in cooler. Cooling too quickly will wrinkle casings.

Adjust clipper if metal clips clip during cooking.

**v. Not Taking Smoke**

Problem: Casings won't absorb smoke.

Solution: Make sure casing isn't too wet, forming a barrier that prevents smoke absorption. It should be tacky to the touch when put into the smokehouse.

**vi. Streaking**

Problem: Too much humidity causes streaks.

Solution: Control humidity levels before and during smoking to prevent droplets of moisture from running down the product, washing off the smoke and causing streaks.

**vii. Muddy Color**

Problem: High humidity during smoke cycle results in muddy appearance.

Solution: Start smoke when casings are tacky to touch. Smoke at 25–30% R.H. and finish at least at 50% humidity.

viii. **Breakage**

Problem of fault – weakness of casing and under thick

Problem of breakage **-** cut the case at wrong length and incorrect weight because

Solution – brining or doubling, reducing weight

**ix. Contamination -** Contamination is most often caused by human contact with hands after the product is cooked.

Solution **-** This contamination can be controlled by hand sanitation and the use of disposable gloves.

x. **Fluctuations in diameter –** making variety of diameter casing along the part of casing

problem – variation width of jet at end or mid, uniformity problem of casing material type or its tear

solution – changing spout to equal diametric cane

**xi. Incorrect label information**

Problem – the information on the product cannot identify and explain the product identity and necessary information for customer. The information may deal about handling product such as storage and shelf life

Solution – isolating and relabel the casing

xii. **poor cleanliness** – contaminating product, change the content of product, going to chemical change.

Problem – impurity of nozzle, material source, and may be personal hygienic.

**xiii. Tearing -** Problem – not smooth wall, reduce weight, resist filling

Solution – pick out at the point worm holes

**xiv. wrong diameter -** problem – different open part, affect filling, affect uniformity of shape, size, and weight. Casing won't stuff evenly.

Solution: Soak casings in water at 90º–100º F (32.2–37.77º C) for 20-30 minutes and make sure water gets inside the casings. Improperly soaked casings won't stuff correctly

xv. **Weakness** - Problem: Casing's release and detach from the meat.

Solution: Soak casings in water at 90º–100º F (32.2–37.77º C) for 20–30 minutes and make sure water gets inside the casings. Avoid very high humidity and drying in the first cycle, which can cause early casing release and separation.

Use a protein-coated casing to adhere casings to the meat. It is best used on summer sausage, beef logs and products not intended for peeling and slicing.

**xvi. Thick ends -** problem – closing the line while filling, Hard-to-peel casings.

Solution: Smoke casings at 25–30% R.H., then finish at least at 50% humidity. If entire cook cycle is too dry, the casings may not peel. Shower casings after smoking. Use an “Easy Peel” casing coated with a release agent on the inside.

**xvii. Pear or teardrop shape**

Problem: Casings aren’t shaped correctly.

Solution: Soak casings in water at 90º–100º F (32.2–37.77º C) for 20–30 minutes and make sure water gets inside the casings. Improperly soaked casings won’t shape out right. Don’t under stuff. Make sure stuffed circumference matches manufacturer’s recommended measurements.

Beware large diameter casings in very long pieces: They may contain too much weight for the casing walls to keep their shape.

Self-Check 3

Name _____ ID: _____ Date _____

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

**Test 1: Written Test**

1. What are the faults of casing?
2. What is the solution of Splitting Casings?
3. What is the problem of Threads of connective tissue, or whiskers?

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note:*** Satisfactory > points Unsatisfactory - < points

**Information sheet 4: Calibrating casings according to product specifications**

## 4.1 Introduction

Calibration is the terminological expression used to refer to the actual water diameter (thickness) of a cleaned strand of a sausage casing. Equal diameters of specific strand Lengths are tied together to make up a prespecified overall length of a bundle or a hank of sausage casings. Processing parameter will change according to product specification. If the enterprise uses an equipment for different product specification calibration must do for next process. Simple thin cellulose casings are used as peeling casings for frankfurter type sausages. calibration may be required for the following reasons:

- a new instrument
- after an instrument has been repaired or modified
- moving from one location to other location
- when a specified time period has elapsed
- when a specified usage (operating hours) has elapsed
- before and/or after a critical measurement
- after an event, for example
- after an instrument has been exposed to a shock, vibration, or physical damage, which might potentially have compromised the integrity of its calibration
- sudden changes in weather
- whenever observations appear questionable or instrument indications do not match the output of surrogate instruments as specified by a requirement, e.g., customer specification, instrument manufacturer recommendation.

**Basic calibration process and purpose and scope**

The calibration process begins with the design of the measuring instrument that needs to be calibrated. The design has to be able to "hold a calibration" through its calibration interval. In other words, the design has to be capable of measurements that are "within engineering tolerance" when used within the stated environmental conditions over some reasonable period of time. Having a design with these characteristics increases the likelihood of the actual measuring instruments performing as expected. Basically, the purpose of calibration is for maintaining the quality of measurement as well as to ensure the proper working of particular instrument.

In general use, calibration is often regarded as including the process of adjusting the output or indication on a measurement instrument to agree with value of the applied standard, within a specified accuracy. For example, a thermometer could be calibrated so the error of indication or the correction is determined, and adjusted (e.g., via calibration constants) so that it shows the true temperature in Celsius at specific points on the scale.

This is the perception of the instrument's end-user. However, very few instruments can be adjusted to exactly match the standards they are compared to. For the vast majority of calibrations, the calibration process is actually the comparison of an unknown to a known and recording the results.

The batter is filled into such casings (caliber range 12-42 mm) and portioned. Thereafter the products undergo smoking and cooking (at 74˚C), which causes the build-up of a firm layer of coagulated protein under the casing.

After this heat treatment, the cellulose casings are removed and the sausages maintain their shape due to the firm external layer of coagulated protein. As ready-to-eat sausages do not have a casing, they are also known as “skinless sausages”.

Cellulose casings are not suitable for larger sausage calibers as frequent breakages may occur due to rupture of the cellulose wall. In order to solve this problem, fibrous casings were developed. Fibrous casings are cellulose casings reinforced with strong cellulose fibers. These fibrous casings are resistant enough for large sausage calibers and still suitable for smoking.

As a further step in the development of strong fibrous casings for large calibers, a layer of synthetic material, (e.g., PVDC) was added to the inside or outside of the casings (coated fibrous casings). The coating made the casing mechanically very resistant and created a complete barrier for gases, i.e., no evaporation losses can occur.

However, fibrous casings with an inside or outside synthetic coating cannot be used for products to be smoked, as no smoke penetration is possible, and for products to be dried and fermented, as no water vapor evaporation is possible. They are mainly used for cooked sausages of the raw-cooked and the precooked-cooked type.

The main advantage of coated fibrous casings for cooked sausages is the casing wall tightly enclosing the sausage mix and the easy peeling. As smoke does not penetrate through coated fibrous casings, smoke flavor can be added during manufacture of the sausage mix if desired

Precisely portioned, perfectly calibrated and equal length fresh, cooked or dry sausages – perfect synchronization of the Handman vacuum fillers with the AL systems makes this first-class product

quality possible. The vane cell feed system, state of-the-art servo drives and Windows-based control technology of the vacuum fillers with the voider portioning and automatic casing change function of the AL systems guarantee a comprehensive, safe and efficient production process.

**Self-Check 4**

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 (3point)

1. Calibration may be required for the following reasons except one:
   A. after an instrument has been repaired or modified
   B. moving from one location to other location
   C. when a specified time period has elapsed
   D. No answer

2. Calibration is the terminological expression used to refer to the actual _____ of a cleaned strand of a sausage casing.

A. water diameter
B. water thickness
C. strand Lengths
D. a and b
E. all

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note:*** Satisfactory > points Unsatisfactory - <points

**Information sheet 5 Preparing casing**

### 5.1 Introduction

Casing can be prepared from natural casing and synthetic casing. Natural casing is prepared from animal intestine. But natural casing is perishable it needs storage control and brining. Synthetic casing may affect the quality of food and difficult during smoking food. In this learning guide we try to preparing natural casing or sausage casing**.**

Casings are produced by first removing the mucosa and any undesirable elements such as fat, threads, and animal fluids. This removal is facilitated by a series of both hot and cold-water soaks.

The fully cleaned casings are then placed in a saturated salt environment to prepare the casings for further processing. The casings are then sorted into various grades and diameters.

**5.2 Preparing natural casing**

If you used a wet brine then you can simply rinse them off under the sink. Just make sure you are able to get rid of any excess salt that might affect the taste of the sausage.

Also, the salt is going to take on some flavor from the raw casings so it's best to get it all off completely.

There are only a few types of sausage casing that need soaking. Natural casings, fibrous casings and certain collagen casings. Cellulose casings will not need to be soaked.

Soaking them prior to stuffing is will make the casings more malleable. This helps to make a sausage that is evenly packed and much easier to work with.

**5.2.1 Soaking Casings**

The time required to soak the casings depends on the type. Natural casings take the longest, soak them for 60 minutes. Fibrous casings can be soaked for about 30 minutes.

These are the quickest soak times that can be done. Generally, the fresher a casing the less soaking is required. Other factors determine how long a casing should be soaked. The older the casing the longer it may need to be soaked. Also, how strong the casing is and how dry.

In the case of older and more dry casings (either natural or synthetic), soaking them overnight can be done. Just make sure to start them with warm water. Then store them soaking in your fridge.

Then they should be introduced to warm water again prior to stuffing. This allows them to be easily stretched to prevent breaking.

To ensure the proper preparation of natural casings, follow these simple procedures

- Prepare casings no less than 2 hours prior to stuffing
- Draw from the barrel the number of hanks needed to fulfill your requirement for the day. A chart with approximate stuffing weights of each casing used in the plant should be posted to assist in determining how many hanks of any given size will be needed to hit production targets.
- Place casings in your soak tanks with a water temperature between 95 and 105 degrees. If casings are extremely compacted in the nets, loosen the nets as you are placing them in the tanks. Install a "governor" to prevent water temperature from exceeding 105 degrees and damaging the casings.

> Maintain water temperature throughout the soaking process.
> When casings appear to be pliable, transfer to pans and bring to the stuffing tables.
> Leftover casings should be drained of fresh water and salt added to stabilize the casings. Then follow the soaking procedures above before using the next day. It is imperative to use all leftover casings at the beginning of the next day's production

**Figure 9. soaked natural casing**

### 5.2.2. soak out casings or and time of soaking

**A. Hog – Salted**

The fast soak: If in a hurry, follow these instructions but understand that you may not get maximum expansion capacity from the casing. Rushing the Soaking process can result in the casing being sticky and they may not slide easily from the horn. This can result in breakage and sausage that is irregular in diameter or too small.

For better results

- Soak overnight in water in refrigerator
- Rinse salt from casings
- Soak in fresh water at 70º F. for 1 hour
- Soak in fresh water at 90º F. for 1 hour
- Place in fresh 90º F. water at the stuffing table

**Hog - Pre-flushed Wet Brine**

- Soak in fresh water at 90º F. for 30 minutes
- Place in fresh warm water at the stuffing table

**B. Beef Rounds:**

- Soaked overnight in cold water.
- Soaked in warm water 90-100º F. for 30 minutes
- Placed in fresh warm water at the stuffing table

**C. Sheep Casings:**

- Soaked in fresh water at 85-90º F. for 30 minutes
- Placed in fresh warm water at the stuffing table.

### 5.2.2 Handling Casings

The fully cleaned casings are placed in a saturated salt environment to prepare for further processing. The casings are then sorted into various grades and diameters. The selection process is dictated by such factors as: type of animal, and criteria set by the casing processor and ultimately the sausage producers.

### 5.2.3 Determining Quality

Qualities are determined in several precise and labor-intensive ways.

In sheep, for example, an "**A**" quality casing is determined during selection, and is defined as a casing with no holes or weakness. This casing can be used for the finest frankfurter emulsion. "**B**" quality casings are of acceptable strength and quality for coarse ground emulsions such as those used in Pork Sausage.

## Self-Check 5

Name _____ ID: _____ Date _____

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

Test 1: Choose the best answer (3 point)

1. There are only a few types of sausage casing that need soaking except;
   A. fibrous casings
   B. certain collagen casings.
   C. Cellulose
   D. Natural
2. Fibrous casings can be soaked with salt for about _ minutes
   A. 60
   B. 40
   C. 90
   D. 30

Test 2: short answer

1. From which animals casing preparation is selected?

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note:*** Satisfactory > 9 points Unsatisfactory - <10 points

**Information Sheet 6 Flushing casings thoroughly with cleaning water**

### 6.1 Introduction

Flushing is washing and pushing water at inner part of casing. Natural casing or sheep, goat or beef intestine has washed after soak before filling. The impurity of casing is checked or adding brine facilitate cleaning.

Flushing is done by forcing tap water is through the gut in order to remove the remaining intestinal contents. All the operations up to this stage can be undertaken in the slaughterhouse itself. Mains water supply should provide an ample supply of potable water. Water should be distributed to all parts of the plant under adequate pressure, which in the mains pipeline should be at least 20 psi. The hot water supply should have a temperature of 82°C.

Water storage tanks must hold at least one day's water requirement. The recommended water requirement is

- 454 liters/day per pigs,
- 272 liters/day per bovine and
- 45 liters/day per sheep or goat**.**
- plus 25% at a reasonable pressure of 15 psi

Rinse natural casings in cold water 2-to-3 times; add additional water and refrigerate overnight. Or rinse in warm water and use immediately.

### 6.2 Cleaning the casing:

Rinse casing well with potable water. Lay the casing in lukewarm water for 15 to 30 minutes prior to use. This will soften the casing and make it more workable. For storage remove excess water and add a liberal amount of salt before repacking.

Always store collagen in a cool dry area. Ensure the filler nozzle is kept dry when using collagen. Reseal, to ensure it stays dry, after use.

Cutting a piece of casing 3 meter or more

- Rinsing the casings (inside and outside) under running water
- Filling a bowl with cold water and the juice of ½ lemon
- Soaking the casing for a couple of hours
- Rinsing again the casings (inside and outside) under running water. Get the casings ready

for filling by making sure that they are not any visible knots

**Figure 10. flushing casing with water**

**https://www.youtube.com/watch?v=9BOnT7AMgUE**

**Self-check 6**

Name _____ ID: _____ Date _____

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

Test 1: True or False

1. Natural casing or sheep, goat or beef intestine has washed before soak before filling.

| Information sheet 7 | Spooling casings or pulling into filling tube or nozzle in preparation for further processing |
|---|---|

2. Flushing is done by forcing tap water is through the gut in order to remove the remaining intestinal contents

Test 2: Write short answer

3. How cleaning casing is realizable?

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note:*** Satisfactory > points Unsatisfactory - < points

**Introduction**

Pulling is a term applied to the process of separating the mesentery and fat from the sheep and goats or pig's intestinal tract and dividing into parts, which require different treatment. It is done by hand without using any instruments as intestines from these animals being very thin and fragile or easily removed.

In other way spooling the one ends of casing to flushing with water to wash brine and cleaning natural casing.

During rinse casing well with potable water fit through nozzle at the end of on side casing. Lay the casing in lukewarm water for 15 to 30 minutes prior to use. This will soften the casing and make it more workable

**Figure 11. Pulling casing to water pipe**

**https://www.youtube.com/watch?v=p4SVpP14zFU**

| **Self check 7** |
|---|

Name _____ ID: _____ Date _____

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

**Test 1 short answer**

1. What is purpose of spooling or pulling casing to water tube or nozzle?

2. How long take to rinse soaked casing?

**Answer Sheet**

| Score = _____ |
| --- |
| Rating: _____ |

Trainer Name: _____ Date: _____

***Note:*** Satisfactory > points Unsatisfactory - < points

**Information sheet 8: Preparing correct quantity of casings**

## 8.1 Introduction

All casings are carefully measured either by a machine or by hand. The measuring of casings is important and must be accurate since the measured unit becomes the criteria by which prices are determined. Hog casings and sheep casings are prepared in 91- meter (100 yard) hanks or bundles. Beef casings are sold in meter bundles or by the piece.

Equal diameters of specific strand Lengths are tied together to make up a prespecified overall length of a bundle or a hank of sausage casings. Processing parameter will change according to product specification. If the enterprise uses an equipment for different product specification

## 8.2 Identifying casing quantity requirement according to product specifications

The most popular size casing for a fresh

There are no standards dictating the size casing to be used for a particular sausage. The size casing you use for sausage should depend on what you want your sausage to look like. The specification of the packaging and above all, your preference will influence the casing size.

Traditionally, smaller sizes (28-35 mm) are used for fresh sausage and larger sizes (35-40 mm) for smoked sausage. For snack stick and breakfast links use 20-26 mm.

**a) Identifying casing size requirements for specific products**

Used for: hot dogs, smoked and cured bratwurst and Mett wurst

Size: 21mm, 24mm, 32mm

**b) Identifying casing size requirements for specific products in regard to diameter**

- Use for: ring bologna, bologna, trail bologna and summer sausage
- Size: 1 1/2" x 18"
- Non-edible

Preparation: Soak in non-iodized salted water for 3 - 5 minutes (1 gallon of water to 1 cup of salt)

Cooking Method: Can be hung in smoker or cooked in the oven until the internal temperatures reaches 165°.

- Holds 1 - 1 1/2 lbs. per casing.
- Shrinks with the meat to prevent wrinkling.
- These casings will curve when stuffed

Sheep

The smaller diameter of sheep casings makes the perfect for making small link sausages like breakfast sausage and hot dogs, to snack sticks.

Table 1: casing diameter specification with product

| | |
|---|---|
| 20-22 mm | Breakfast Sausage • Small Snack Sticks |
| 22-24 mm | Breakfast Sausage • Snack Sticks |
| 24-26 mm | Small Hot Dog • Wiener |
| 26-28 mm | Large Hot Dog • Wiener • Land jaeger |




**Figure 12. cutting natural casing for spooling Figure13. Cut and slapped casing**

**https://www.youtube.com/watch?v=2WF0PT-t8tY**

**Self-check 8**

Name _____ ID: _____ Date _____

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

**Test 1: choice**

1. what size in length require for cured bratwurst and Mett wurst?
   A. hot dogs, 21mm,
   B. hot dogs 34mm,
   C. sheep 32mm
   D. All

2. What size of sheep casing used for sausage?

A. 22-24 mm for breakfast

B. 20-22 mm for snack

C. A and B

D. ALL

Answer Sheet

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note**:* Satisfactory > 9 points Unsatisfactory - <10 points

## Information sheet 9: Preparing casings according to Occupational Health and Safety (OHS), and hygiene and sanitation

**Introduction**

Health and safety are important issue to complying the given duty in performance. To keep the safety and health of operator identified hazards in operation is controlled according to work place regulation and operation procedure.

While operation and loading material using hygienic and sanitized PPE and holding material's is recommended according to food safety management system and quality assurance system

**OHS legal requirements**

**Health status**

Personnel and visitors known, or suspected, to be suffering from, or to be a carrier of a disease or illness likely to be transmitted through foodstuffs, are not allowed to enter the production area if there is a likelihood of foodstuff contamination by these persons. Any person so affected immediately reports his/her illness or symptoms of illness to the management.

Conditions that must be reported to management are: jaundice, diarrhea, vomiting, fever, sore throat with fever, visibly infected skin lesions (boils, cuts, etc.), discharges from the ear, eye or nose. Medical examination of a food production employee should be carried out if clinically or epidemiologically indicated.

**Personal Protective Equipment (PPE) which may include:**

- ✓ aprons
- ✓ eye and facial protection
- ✓ head-wear
- ✓ lifting assistance
- ✓ mesh aprons
- ✓ protective boot covers
- ✓ glove
- ✓ protective head and hair covering
- ✓ uniforms
- ✓ waterproof clothing

**Relevant government regulations**

**General principles on hygiene**

Meat hygiene requirements should control hazards to the greatest extent practicable throughout the whole food chain. Information from primary production should be taken into account so as to tailor meat hygiene requirements to the spectrum and prevalence of hazards in the animal population from which the meat is sourced. The establishment operator should apply Hazard Analysis and Critical Control Point (HACCP) principles.

The competent authority should define the role of those personnel involved in meat hygiene activities where appropriate, including the role of the veterinary inspector. The competent authority should verify that the establishment operator has adequate systems in place to trace and withdraw meat from the food chain.

Competent authorities should recognize the equivalence of alternative hygiene measures where appropriate, and promulgate meat hygiene measures that achieve required outcomes in terms of food safety and suitability and facilitate fair practices in the food trade.

The cleaning and disinfection program should ensure that all parts of the establishment are appropriately clean, including cleaning equipment. To monitor the suitability and effectiveness of the cleaning activities periodical verification should done via hygiene inspections (e.g. daily) and microbiological sampling (e.g. weekly).

**International Regulations on Casings**

The Food Safety and Inspection Services (FSIS) published the final rule regarding the labeling of sausage casings in the Federal Register on August 6th, 2001 (9CFR Parts 317 and 381). A subsequent notice was released on February 22nd of 2002 to clarify the final rule by publishing a list of frequently asked questions and answers regarding the new regulations concerning the use of natural or regenerated collagen sausage casings.

The notice states that collagen casings on sausage products need to be identified on the label if the collagen is derived from a species other than that which is in the product or if the source of the collagen is unknown.

This final rule also applies to sausage-like products (i.e., meat sticks), co-extrusion technology, as well as natural casings. If the type of casing is placed on the ingredient statement, it does not have to be in the proper order of predominance. The type of casing can be placed at the end of the ingredient statement.

For example, the statement could read “packed in sheep casing,”” encased in collagen casing,” “in hog casing,” or “formed in collagen casings.” The overall reasoning behind the new labeling

protocol is to notify the consumer of specie content in the sausage product (i.e., beef sausage stuffed in natural hog casings).

**Quality of Casings**

The quality of natural casings is determined in several labor-intensive procedures. Quality “A” casings are defined as casings with no holes or weakness. Quality “B” casings are of acceptable strength and quality for coarse ground sausage. Another quality characteristic used to sort casings is color. Some casings will be white or virtually transparent/ clear, while others may be darker and opaquer.

**Shipping of Casings**

Casings can be shipped in a variety of forms. The three common forms of shipping are: dry salt packed, slush or pre-flushed packed, and pre-tube packed. Dry salt packed: Excess moisture is removed from the casings and packed in a semi-dry state.

This type of packaging is usually appropriate for long distance travel and/or prolonged storage at ambient temperatures. Slush or pre-flushed packed: Casings are packaged in a water/salt moisture. The casings are very soft and flexible and do not require flushing prior to stuffing sausage. Pre-tube packed: Each strand of natural casing is shirred on a tube to allow one-step loading of the casings directly onto the stuffing horn. Casings should be stored in a controlled, cool environment. A neutral temperature of 4-10 degrees C (40- 50 degrees F) is ideal.

**Work place sanitation requirements**

Cleaning of the workshops and premises should be done according to an implemented cleaning and disinfection program. The maintenance plan and cleaning and disinfection program should prevent contamination (physical, chemical, biological) of the natural casings.

**Personal Hygiene**

**Health status and personal cleanliness and behavior**

Personnel and visitors known, or suspected, to be suffering from, or to be a carrier of a disease or illness likely to be transmitted through foodstuffs, are not allowed to enter the production area if there is a likelihood of foodstuff contamination by these persons.

Any person so affected immediately reports his/her illness or symptoms of illness to the management.

Conditions that must be reported to management are: jaundice, diarrhea, vomiting, fever, sore throat with fever, visibly infected skin lesions (boils, cuts, etc.), discharges from the ear, eye or nose. Medical examination of a food production employee should be carried out if clinically or epidemiologically indicated.

**Personal cleanliness and behavior**

Personnel and visitors should maintain a high degree of personal cleanliness and wear suitable protective clothing, head covering, and footwear in production areas. Cuts and wounds, where personnel are permitted to continue working, should be covered by suitable waterproof dressings.

Personnel and visitors should wash their hands when personal cleanliness may affect food safety (e.g., at the start of foodstuff handling activities, before and after each break, after toilet use). Visible personal items (e.g., jewelers and watches) are not allowed in production areas. Behavior that could result in contamination of foodstuffs (e.g., smoking, spitting, chewing or eating) is not allowed in the production area.

**Self-check 9**

Name _____ ID: _____ Date _____

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

**Test 1: written test**

1. What is health status of operator of casing preparation?
2. How hazards can be controlled with hygiene?
3. What has identified on collagen casing label according to International regulation

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note:*** Satisfactory > points Unsatisfactory - < points

## Information sheet 10 Storing casings according to manufacturer specifications and hygiene

### Introduction

Sausage casings can last a very long time when stored properly. Luckily storing them is pretty straightforward and simple. But there are definitely a few nuances between the types of sausages to understand first.

I wanted to put together an easy-to-follow guide that covered all there is to know about storing sausage casings. So here is what I learned along the way to share with fellow sausage enthusiast.

**Storing Sausage Casings…**

Natural casings such as hog, sheep or cow are always best to use fresh as possible. Since even when freezing them, the quality will degrade over time.

Still freezing them is better than leaving them storing them on a counter or shelf. Which you should not do, any sunlight, humidity or temperature changes will ruin the casing.

Natural casings are made out of animal intestines. Unlike other casings, natural ones are the most perishable. Since there is not any synthetic material used to make them. The only type of casings you don't have to worry about going bad are artificial casings. If you want to know which sausage casings are edible and which aren't read:

**Storing Natural Sausage Casings Such as Hog**

You can store natural sausage casings in either a refrigerator or freezer. You should always keep natural casings sealed and in a wet brine or a dry salt to help preserve them. Natural casings will have to be preserved properly since they are perishable, using a preservative is required for long term storage. The best preservative to use is salt.

There are two types of salt preservation that can be used. Granulated or a salt solution called brine. Also referred to by sausage makers as wet or dry brine. Brine will be a wet salt, with extra liquid as opposed to granulated salt packing.

The main reason for a brine solution (wet brine) is to prevent freezer burn. Since the salt water will not freeze. Preventing the casing from freezing is good to keep it from tearing. Wet brine is also better for storing a larger batch of casings. Dry brine is best for a smaller number of casings.

This is because you can use less salt with a brine but still have enough for a large batch.

Brine is good for freezing sausage, but dry salt works best for long term storage outside of a freezer. Brine solution should be changed out regularly when storing the casings long term. Try doing this quarterly, you can also check on the casing at this time to make sure they are holding up. When using granulated avoid using any extra mineral sea salts. Sea salt with extra minerals can change the flavor and color of the natural casings. Non-iodized, pure salt or kosher works best. Do not just use regular table salt.

The best way to preserve natural casings is to keep them in an airtight bag (vacuum sealed) or container. With the casing completely covered in salt. Do not let the temperature exceed 40 degrees Fahrenheit.

Refrigeration is the most recommended way to store sausage casings. Place them in the back of a refrigerator to keep temperature consistent.

When buying natural sausage casings, they aren't shipped refrigerated. But they will come preserved in salt. You shouldn't have to refrigerate them until you have opened package.

The period of time you are going to store them is important. Long term uses dry salt, shorter term uses a brine (or when freezing them).

**Quick Recap**

Salt is the best preservative for sausage casings and there are two ways to use salt. One is a wet salt called brine and the other is dry called granulated.

Refrigeration and freezing natural sausage casings are a must. Refrigerate with dry salt and freeze with a brine. Avoid heavy mineral and iodized salts.

**Storing Synthetic/Artificial Sausage Casings**

Artificial casings are going to be made out of collagen (the appearance is clear and they are made from animal hide or bone, collagen is edible) and cellulose (non-edible fibrous casings made from wood pulp and fibers).

Storing artificial casings is about having a proper environment. Keep them out of direct sunlight, intense heat and moisture. Store them in a cool and dry place in a sealed package or container.

Fibrous casings are dehydrated already, so keep them dry until you are ready to use them. Since most dry sausages use a fibrous casing, the casing itself is shelf stable.

Collagen casings don't have to be salted but should be kept in a refrigerator. This will prevent them from drying out any further. Which can cause the casing to crack. Also makes them less expansive and prone to splitting when stuffing them.

You can use the original packaging they came in if possible. When stored properly you can expect these casings to last up to two years. Collagen casings are easier to store, and also to stuff with. Since they are less fragile and easier to prepare.

**Freezing Sausage Casings**

Each type of sausage casing can be stored in different ways. Certain ones will not hold up as well to being frozen. As mentioned earlier you can freeze sausage casings but you should do it properly.

When freezing natural sausage casing, they should be first preserved in a wet brine solution. This will help to prevent freezer burn and crystallization on the sausage casing. Making sure they do not tear while freezing. You can freeze them this way for up to 2 years.

**Sausage Seasonings**

You can ensure your sausages taste the best by using a sausage seasoning. Great for if you are just starting out or don't have the time to mix your own. Check out the best sausage seasonings.

In closing we have covered the two salt preservation types to pack or re-pack your natural casings into. The types are wet and dry salt and which one works better for different situations.

We also went into detail about the different types of sausage casings and the shelf life of each. Lastly, we focused on how to prepare your sausages after refrigeration or freezing them before using them.

https://www.youtube.com/watch?v=-7umtE-weow

**Self-check 10**

Name _____ ID: _____ Date _____

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

**Test 1. True or false**

1. You can store natural sausage casings in either a refrigerator or freezer.
2. Natural casings such as hog, sheep or cow are always best to use fresh as possible use regular table salt.
3. When freezing natural sausage casing, they should be first preserved in a wet brine solution.

**Test 2 write answer**

4. What is the best way to preserve natural casings?
5. What ways of natural sausage casing preserved with salt?

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note:*** Satisfactory > points Unsatisfactory - < points

**Operation sheet 1 selecting and preparing casing**

**Natural Sausage Casing Preparation procedures**

1. Place the casings in a bowl and run water over them.
2. Try to be gentle when you do this so they don't get tangled.
3. Soak the casings in hot water less than 95°c with salt 30% for 30 minutes and add salt according to your casing weight
4. Now take each casing, one at a time and flush cool water through the inside of the casing to get rid of any salt.
5. Pull with hand to separating the mesentery and fat from the sheep
6. Repeat that process for each casing
7. Rinse with hot water temperature is 60ºc for 15 minutes
8. Cut in 50cm length
9. Store in freeze or airtight place with salt

**LAP Test: preparing of sheep casing**

Name…….  ID……..

Date…….

Time started: _____ Time finished: _____

**Instructions**:

1. Use PPE recommended in your information sheet.
2. Carryout any OHS regulation your information sheet for boiler operation
3. Given necessary prototypes, tools and materials you required to perform the following tasks within 2 hours.
4. The project is expected from each student to do it.

**Task 1.** Perform preparation of sheep casing

| LG 39 | LO#2 Prepare casings for fill |
|---|---|

**Instruction sheet**

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

- Arranging Casing Materials
- Confirming specifications of casings for each product
- Checking casings for faults
- Preparing casings
- Flushing casings thoroughly with clean water in accordance with workplace
- Spooling or pulling casings into filling tube or nozzle in preparation
- Preparing correct quantity of casings in accordance with production specifications
- Preparing casings of Occupational Health and Safety (OHS) and hygiene and sanitation
- Storing casings according to manufacturer's specifications and hygiene

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:

- Arrange Casing Materials
- Confirm specifications of casings for each product
- Check casings for faults
- Prepare casings
- Flush casings thoroughly with clean water in accordance with workplace
- Spool or pull casings into filling tube or nozzle in preparation
- Prepare correct quantity of casings in accordance with production specifications
- Prepare casings of Occupational Health and Safety (OHS) and hygiene and sanitation
- Store casings according to manufacturer's specifications and hygiene

**Learning Instructions**

Read the specific objectives of this Learning Guide.

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

## Information sheet 1 Arranging Casing Materials

Arranging is placing in proper way the selected items for specific purpose. Good arrangement is the sharp activity used to fast the work. In this section arranging way and requirement is reminding the operator before start the work. Arrange must be done according to OHS regulation. Arranging has the following advantage in any work operation;

- ✓ Provide visual control of activities
- ✓ Use space efficiently
- ✓ Use labor efficiently
- ✓ Eliminate bottlenecks
- ✓ Facilitate communication and interaction between workers and supervisors
- ✓ It is environmentally friendly
- ✓ work speed to production

Selected casing and machine have arranged according to process line or step operation. Then prepared product is assembled to filling unit.

**Figure 14. Different types of casing arrengement for selection**

The location of the establishments should be carefully chosen and protective measures (e.g. alarm system, guards) should be taken to prevent any threat to food safety or suitability. Production equipment should be located in a way that enables its intended use, adequate maintenance and

facilitates good hygiene practices. Each natural casing establishment will be audited and subsequently approved if it was found to be in accordance with the requirements stipulated in Regulation (EC) No 852/2004 and Regulation (EC) No 853/2004.

The internal product flow should be developed in such a way that prevents cross contamination between “clean” products and “dirty” areas. The design of the establishment should be logical and supportive to this goal.

**Self-check 1**

Name _____ ID: _____ Date _____

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

Test 1. True or false

1. Good arrangement is the sharp activity used to fast the work.
2. Selected casing and machine have arranged according to operator conformant.

Test 2 written

1. Explain advantage of arranging in any work operation
2. Discuss relation of arranging to OHS

**Answer Sheet**

Score = _____

Rating: _____

Name: _____ Date: _____

***Note:*** Satisfactory > points Unsatisfactory - < points

## Information sheet 2 Confirming specifications of casings for each product

### 2.1 Introduction

Identifying and checking or rectifying the selected casing used for specified product is the issue of customer requirement delegation case. Confirmation has carryout by using from recorded program with specified characters in correct measurement. The specified quality log must respect. Expecting the fault and balancing the situation leads problem is concerned in this activity. Specification is the identity of something that shown by its character or features. Specification is needed for special need and operation.

### 2.2 Specifications for Sheep Casings

Gold Crown Sheep Casings of the highest quality are obtained from the small intestine of the sheep and are used in the production of Dry Wors, Cocktail Sausages, a variety of Meat Sticks, Frankfurters, Cheese-Grillers, Knackwurst, Bockwurst etc.

The narrower calibrations i.e., 18 mm to 22 mm are mostly used for the smaller thinner products such as dry wors, cocktail sausages and thin meat sticks whereas the wider calibrations are used for the other products mentioned above. Sheep Casings are sold in “bundles” or “hanks”.

• Bundles of Gold Crown Natural Sheep Casings measure approximately 91 meters in length (soaked in water).

• Gold Crown Natural Sheep Casings are offered in bundles classified as follows for ease of reference and reorder: - Sheep Longs – Maximum of 21 strands (pieces) per bundle of 91 meters - Sheep Longs Eezi Load Tube – Maximum of 15 tubes (shirred casing strands on a special type of tube) per bundle of 91 meters - Sheep Medium Longs – Maximum of 50 strands (pieces) per bundle of 91 meters.

Uses for Sheep Casings: Sheep casings are generally used for products such as:

| | | |
|---|---|---|
| Cocktail sausages | Frankfurters | Various types of meat |
| Breakfast sausages | Cabanossi | sticks |
| Thin boerewors | Bier knacker | Bockwurst |

#### 2.2.1 state of specifying casing

1. Determine the batch size (volume) of prepared sausage required. Keep in mind that 40 kg wet sausage will yield approximately 25 kg of dry sausage.
2. Also determine how often this same volume of dry product must be provided. For example, every third day.

3. Calculate the length of time (in days) the 40 kg of wet product will need to reach maturity. Since the delivery span is only three days, the diameter (thickness) of the calibration of the ideal casing to be used will be very important.
4. Request the narrowest calibration of a sheep casing to ensure the freshly filled dry sausage will reach maturity in the shortest possible time-span – 18 mm in this case;
5. Determine the approximate stuffing capacity (weight) of filled sausage per bundle to calculate the number of bundles required for each batch of 40 kg fresh product. Using an 18 mm diameter sheep casing, one would require approximately three bundles per 40 kg batch.

An 18 mm sheep casing with an approximate stuffing capacity of 16 kg per bundle would in this case be the recommended sheep casing to use.

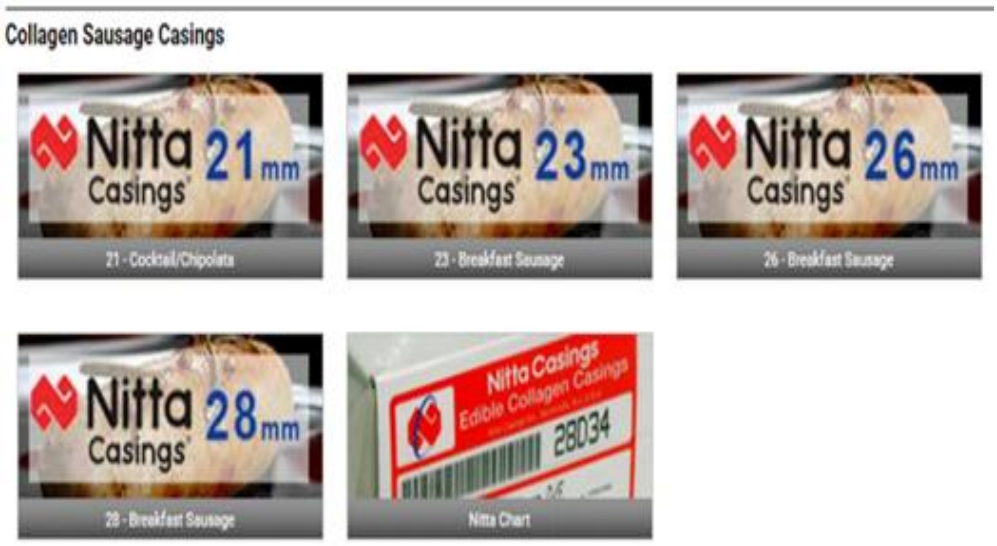


**Figure15. different diameter casing**

### 2.3 Calculating the cost of the natural casing

The natural casing being used as part of the total cost of the end-product manufactured is calculated

- Filling or stuffing capacities are measured in kilograms per bundle or hank of 91 meters.
- The value (price) of the bundle including VAT divided by the weight in kg = the net cost per kg of the natural casing.

For example; B150.00 ÷ 18 kg = B 8.33/kg = cost of casing.

The actual cost of the natural casing per kg as above, (the casing-cost-factor) should always be included as part of the total cost calculation of the Meat-Block of the relevant product-batch 1. The narrower the caliber of the casing, the longer the portion per kilogram.

**Typical Meat Block Using A Boerewors Product as An Example:**

Table 1. cost calculation cafegoers

| | | | | | | |
|---|---|---|---|---|---|---|
| Beef | (80:20) | 20kg | @ | B35 | = | B700 |
| Pork | (70:30) | 10kg | @ | B28 | = | B280 |
| Vinegar | 5% | 1litres | @ | B2.60 | = | B2.60 |
| Water | | 1kg | @ | B0 | = | B0 |
| Batch Pack | | 1.1kg | @ | R59 | = | B64.90 |
| 33.1kg = B1047.50 | | | | | | |
| Cost per kg is therefore Birr31.65 finished product | | | | | | |

Figure 16: Boerewors

The above cost does not include the cost of the casing which can be calculated as follows:

Fill one bundle of the casing, weigh the end product and divide the number of kilograms into the cost per bundle to give a cost per kg.

Example:

| | | |
|---|---|---|
| Casing costs | | birr59.95 per bundle |
| Filled bundle weighs | | 48.00kg |
| Cost of casing per kg | = | 1.25 |
| Cost of meat block per kg | = | 31.65 |
| Cost of casing per kg | = | 1.25 |

**NOTE:** Total cost per kg is therefore B32.90 which excludes the cost of packaging and labor. Prices of meat, spices and casings fluctuate. The prices used above are merely for the purpose of example.

**Self-check 2**

Name _____ ID: _____ Date _____

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

Test 1 choice

1. Sheep casings are generally used for the following products except;
   A. Cocktail sausages
   B. Breakfast sausages
   C. Thin boerewors
   D. Dry Wors
2. All are the ways of specificizing casing except one;
   A. Determine the batch size (volume)
   B. Calculate the length of time
   C. Determine the approximate stuffing capacity
   D. Approximating the weight of stuffs

Test2 work out

1. What is the price of beef filling casing in kg? If a 30kg beef can block in the 50meter bundle @10birr without casing price. Then the price of 20m of casing is 50birr
2. If the filled casing beef is sold @180birr/kg; what is the price of uncasing meat in kg?

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note:*** Satisfactory > points Unsatisfactory - < points

**Information sheet 3 Checking casings for faults**

For production of qualified and safe food the casing has free from the following faults. Those faults are checked during casing preparation and preparation for filling casing.

**Whisker**

A whisker on a natural casing is often referred to as “hair” or “longish beard” on the surface. The whiskers visible are actually the “veins” on the surface of the intestine-runner that attach the intestine to the animal-carcass they are actually “blood-veins” and part of an animal’s biology.

**Breakage**

Once it has been filled to capacity it cannot stretch or expand much further the way. i.e., a sheep casing cannot but, a hog casing can. The tissue of the outer layer of a sheep casing is very soft and the texture is much thinner than that of a hog casing.

**Worm Holes**

Worm holes a place worm sited to survive on inside wall of casing. If the casing is filled the developed and causes disease after serving the food.

**Wrong Diameter**

Wrong diameter deals with out of size and weight specification on casing**.** Precisely measuring diameter of casing is vital for exact price and to kept uniformity of product.

**Webbing**

All casings have a degree of webbing within some sections. The webbing is caused from the removal of payer patches on the surface of the intestine during the cleaning process. This can form scarring and, in some cases, affect the transparency of the casing. Small threads or whiskers appear when intestines are knife cut at the slaughterhouse. The closer the knife is held next to the intestine the shorter the whiskers will be on the cleaned casing. Whiskers disappear during the cooking process.

**Self-check 3**

Name _____ ID: _____ Date _____

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

**Test 1. Choice**

**1.** casing filled to capacity it cannot stretch or expand much further the way fault is

A. Whisker
B. Breakage
C. Webbing

**2.** Fault deals with out of size and weight specification on casing is;

A. Whisker
B. Breakage
C. Webbing
D. Wrong diameter

**3.** _____ is caused from the removal of payer patches on the surface of the intestine during the cleaning process.

A. Whisker
B. Breakage
C. Webbing
D. None

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note:*** Satisfactory > points Unsatisfactory - < points

## Information sheet 4 Preparing casings

4.**1**

### Preparing natural casing for selection

Preparation casing to filling area for filling operation. Take outing the casing from store Before stuffing your sausages, it is essential to rinse all salt off the casings by soaking them thoroughly in fresh water. The ideal bathing temperature is between 20 and 30 degrees. Avoid water any hotter than 30 degrees as it may promote bacterial growth and damage the strength and integrity of the casings.

### 4.2 preparation of Artificial casing for filling selection

There many different kinds and features of casing manufactured for relevant purposes. You have daily specified the product to produce to supply on market in different show to attract customer. Therefore, instantly you should have to prepare in different casing ways of filling and formulating. To do this select the casing in your store and in your bought display sample. Then prepare for filing according to manufacture recommendation.

https://www.youtube.com/watch?v=-kAycl4q9w4

## Self-check 4

Name _____ ID: _____ Date _____

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

Test 1; True or False

1. Stockout is essential to rinse all salt off the casings by soaking them thoroughly in fresh water.
2. Artificial casing is preferable for filling and safe with smoking process

Test 2. Written

1. What is the problem come from rinsing casing with mild temperature water?

**Answer Sheet**

_____

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note:*** Satisfactory > points Unsatisfactory - < points

## Information sheet 5: Flushing casings thoroughly with clean water in accordance with workplace

**Reasons Why Flushing of a Natural Casing Is So Important**:

It is essential that Crown National customers carefully follow the steps detailed below when preparing the natural casing prior to filling. Failure to do so invariably ends up in unsatisfactory results which are then blamed on the casing when in fact the cause is ill preparation. By

adhering to the four basic procedures as set out below you will achieve ultimate satisfaction and best results from your Natural Casing.

**Important:**

- Insufficient flushing (spooling) will result in salt remaining in the casing tissues.
- The salt crystals in the casings of raw sausage impede water evaporation which in turn makes stuffing (filling) less successful.
- It can also result in discoloration, as well as resulting in the end product tasting too salty.
- At no stage during the flushing and preparation stages should hot water be used.
- Hot water favors bacterial growth.
- Flushed casings must always be stored in cold water in a cold environment.

**Salted bundles:**

1. Rinse the casing thoroughly with fresh water to remove superficial salt.

2. Soften by soaking in fresh water at room temperature (approximately 21º C) for 45 minutes to one hour. Whilst the bundles are soaking in the water, gently hand-massage them periodically in order to separate the strands and prevent dry spots which may adversely affect the stuffing process. After the 45 minutes to one hour, remove them from the room temperature water and soak them in 30º to 32º C (lukewarm) water for thirty minutes prior to use.

3. Pre-flush by introducing water into the casing and allow the water to “run” through. This will ensure that the last remaining bits of salt are flushed out of the casing and will also facilitate getting the casing onto the filling horn (filler-nozzle) and moving the casing smoothly during the filling process.

4. To further ensure that all salt is removed from the casings, remove and place into a bucket or mega-tray with lukewarm water which can now be transported to the filling table.

**Flushing dry salt on the casing**

Dry salt on the casing influences the flavor profile of the end product.

- The rinsing/soaking/flushing process is extremely important since insufficient attention
- to these stages of the process will result in salt remaining in the casing tissue. It can result in discoloration, as well as resulting in the end product tasting too salty.
- Always wash the casing thoroughly in fresh water to remove superficial salt.

- After rinsing, it is important to also soak the casing in fresh water at room temperature (21° C) for between 45 minutes to an hour. After the rinsing process soak the bundle/s in lukewarm water (about 30° C - 32° C) for approximately 30 minutes.
- After soaking, pre-flush each strand of the bundle by introducing water into the casing strand and allow the water to “run” through the strand to ensure all bits of salt particles on the inside of the casing are flushed out.

**Self-check 5**

Name _____ ID: _____ Date _____

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

Test 1. True/false

1. Insufficient flushing (spooling) will result in salt remaining in the casing tissues.
2. Cold water favors bacterial growth.
3. Flushed casings must always be stored in cold water in a cold environment.
4. Whilst the bundles are soaking in the water, gently hand-massage them periodically in order to separate the strands
5. Dry salt on the casing influences the flavor profile of the end product.

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note:*** Satisfactory > points Unsatisfactory - < points

**Information sheet 6 Spooling or pulling casings into filling tube or nozzle in preparation**

In this step casing going to filled is firm on outside of nozzle. This enables for filling while the products come from filling tube casing starts fill. After pulling casing is ended the open is webbed to block product flow out.

During pulling casing to nozzle, you must careful to avoid casing faults such as contamination, bursting, breakage. So, you can consider the problem raise from those cases, because it is described in last session. While pulling to nozzle;

- select appropriate diameter casing
- Spool slightly if the casing layer is thin
- Cut the casing if more deposited because it expands the diameter and layer bursting

**Figure 17. a) Opening casing**

**figure17. b) spooling casing to nozzle**

Spooling synthetic casing is prep way. Synthetic casing are accordingly ready to fit with nozzle. Their diameter is specified to filling tube and more elastic than natural casing. They creaticaly prepared for simple slugging to nozzle.

**Self-check 6**

**Name** _____ **ID:** _____ **Date** _____

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

Name _____ ID: _____ Date _____

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

Test 1 written

3. What is the purpose of spooling?
4. What are the problems may raise while spooling casing to fill tube?

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note:*** Satisfactory > points Unsatisfactory - < points

**Information sheet 7 Preparing correct quantity of casings in accordance with production specifications**

7.1 Introduction

After filling the length of casing is divided in specificized weight. The length increase when weight required is higher. But the casing has divided in equal length and weight. To quantifying in to equal size and weight you must use precise method of cutting or dividing.

## 7.2 Ways of cutting in to equal length with Handman cutter machine

### A. Equal Lengths

With its belt system, the Hand man length unit combines the perfect synchronization of portioning output with casing removal. And the result is exact lengths accurate to the gram. Simple adjustment and flexible adaptation of the lengths down to the millimeter via the vacuum filler's monitor control permit a wide range of products and adaptation to a great variety of packaging solutions. The conveyor belt principle therefore guarantees a diverse range of products coupled with short setup times and less cleaning work.

### B. Cutting

Separation with the 2-belt solution and sensor for exact identification of the separating point is a highly precise process. This averts the need for rework and reduces both casing and production costs. The sausage separating principle on the belt with a synchronized blade creates a defined gap between the portions and guarantees cleanly separated portions with closed casing ends.

This reliability ensures safe, uninterrupted production. Individual cutting provides scope for diversity coupled with short setup times, from fresh products to dry sausages. Separation into individual portions or strings of any desired length.

### Using hand measure

This method may appear difference between each piece but using scale after cutting to identifying in their weight and for smoking without dividing sewing in equal length used to hanging in smoke.

Firstly, you estimate depend on requirement range of weight not specified. The first piece is determining length and weight all pieces divided.

How to do manual dividing the casing is placing on flat and wide table then bend the first piece to estimated familiar length. Use length limit at both side and bend parallel to the first.

**Figure 18. a. cutting casing with handtman machine figure 18. b) dividing casing with manual**

**Self-check 7**

**Name** _____ **ID:** _____ **Date** _____

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

Test 1. True or False

1. The length must increase with similar diameter casing when weight required is higher.
2. The sausage separating principle on the belt with a synchronized blade creates a defined gap between the portions.
3. The manual dividing is the first piece is determining length and weight all pieces divided

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note**:* Satisfactory > points Unsatisfactory - < points

## Information sheet 8 Preparing casings of Occupational Health and Safety (OHS) and hygiene and sanitation

### 8.1 Equipment preparing

Equipment and containers (other than single-use containers and packaging material) coming into contact with foodstuffs, should be designed and constructed to ensure that, they can be adequately cleaned, disinfected and maintained to avoid the contamination of foodstuffs. For equipment designed for cooling or freezing foodstuffs the temperature should be monitored and controlled as well as the time it takes to reach the right temperature. Measuring devices (e.g., salometer) should be calibrated at least once per year and results recorded and filed.

Containers for waste and inedible substances should be specifically identifiable, suitably constructed and made of impervious material. Containers used to hold dangerous substances should be identified and are kept locked when not in use to prevent malicious or accidental contamination of foodstuffs.

### 8.2 Facility

Facilities for personal hygiene and lavatories should be suitably located and designated. Lavatories should be of appropriate hygienic design and adequate changing facilities for personnel should be available. Wash basins with a supply of hot and cold (or suitably temperature controlled) water for hygienically washing of hands, materials for cleaning hands, and facilities for drying of hands should be easily accessible.

Ventilation systems should be installed to control ambient temperatures and to control humidity and to ensure the safety and suitability of foodstuffs. Ventilation systems should be designed and constructed so that air does not flow from contaminated areas to clean areas and allow for adequate maintenance and cleaning.

Adequate natural or artificial lighting (intensity, color) suitable to the nature of the operation should be provided. Lighting fixtures should be protected to ensure that foodstuffs are not contaminated by breakages in areas where open, unpacked foodstuffs are handled

### 8.3 Location

The location of the establishments should be carefully chosen and protective measures (e.g., alarm system, guards) should be taken to prevent any threat to food safety or suitability. Production equipment should be located in a way that enables its intended use, adequate maintenance and facilitates good hygiene practices.

Each natural casing establishment will be audited and subsequently approved if it was found to be in accordance with the requirements stipulated in Regulation (EC) No 852/2004 and Regulation (EC) No 853/2004.

### 8.4 Control of operation

Control of food hazards

The natural casing industry controls food hazards through the use of the HACCP system.

Key aspects of hygiene control systems

Until natural casings have been slated for the first time, it is necessary to maintain storage in cooled areas (max. 3 °C). Systems should be in place to ensure that temperature is controlled effectively where it is critical to the safety and suitability of foodstuffs (see §3.2.3). Measures should be taken to prevent cross-contamination between cleaned preserved intestines and salted natural casings, e.g., separation (physically or by time), (intermediate) cleaning / disinfection, personal hygiene.

There should be systems in place to prevent the physical and chemical contamination of natural casings (e.g., knife policy, glass policy, pallet policy).

**Water**

Only potable water should be used in the handling and processing of natural casings. Ice used should be produced from potable water and protected from contamination during production, handling and storage. Quality tests on the water used for the production of foodstuffs should be done in accordance to the parameters and frequencies listed in Council Directive 1998/83/EC.

**Transportation**

Where conveyances and/or containers are used for transporting anything in addition to foodstuffs or for transporting different foodstuffs at the same time, there is, where necessary, to be effective separation of products or effective cleaning between loads to avoid the risk of contamination

**Self-check 8**

**Name** _____ **ID:** _____ **Date** _____

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

Test 1. True or false

1. The natural casing industry controls food hazards through the use of the HACCP
2. Only potable water should be used in the handling and processing of natural casings system

**Test 2 Choice**

3. Production equipment should be located in a way;
   A. that enables its intended use,
   B. adequate maintenance
   C. facilitates good hygiene practices.
   D. All
4. Ventilation systems should be installed to control;
   A. ambient temperatures
   B. control humidity
   C. to ensure the safety
   D. suitability of foodstuffs.
   E. A and B
   F. C and D
   G. All
5. Where conveyances and/or containers are used for transporting; where necessary,
   A. to be effective separation of products
   B. effective cleaning between loads
   C. to avoid the risk of contamination
   D. All

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note**:* Satisfactory > points Unsatisfactory - < points

## Information sheet 9: Storing Casings according to manufacturer's specifications and hygiene requirements

### Introduction

The Casing Boutique guarantees all-natural sausage casings with a shelf-life of one year. In order to ensure this guarantee, store your casings in a cool, temperature-controlled environment of between 5°C and 10°C – ideally in the fridge. If your sausage casings are stored between 10°C and 20°C, their shelf life will diminish to six months. Store casings away from direct sunlight and heat at all times.

### Storing Sausage Casing

Natural casings such as hog, sheep or cow are always best to use fresh as possible. Since even when freezing them, the quality will degrade over time.

Still freezing them is better than leaving them storing them on a counter or shelf. Which you should not do, any sunlight, humidity or temperature changes will ruin the casing. Natural casings are made out of animal intestines. Unlike other casings, natural ones are the most perishable. Since there is not any synthetic material used to make them.

### Storing synthetic/artificial sausage casings

Artificial casings are going to be made out of collagen (the appearance is clear and they are made from animal hide or bone, collagen is edible) and cellulose (non-edible fibrous casings made from wood pulp and fibers).

Storing artificial casings is about having a proper environment. Keep them out of direct sunlight, intense heat and moisture. Store them in a cool and dry place in a sealed package or container.

Fibrous casings are dehydrated already, so keep them dry until you are ready to use them. Since most dry sausages use a fibrous casing, the casing itself is shelf stable.

Collagen casings don't have to be salted but should be kept in a refrigerator. This will prevent them from drying out any further. Which can cause the casing to crack. Also makes them less expansive and prone to splitting when stuffing them.

You can use the original packaging they came in if possible. When stored properly you can expect these casings to last up to two years.

**Self-check 9**

**Name** _____ **ID:** _____ **Date** _____

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

**Test 1. True or false**

1. all-natural sausage casings with a shelf-life can be more one year.
2. Collagen casings don't have to be salted but should be kept in a refrigerator
3. If your sausage casings are stored between 1°C and 5°C, their shelf life will diminish to six months.

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note**:* Satisfactory > points Unsatisfactory - < points

| LG 39 | LO3 Prepare filling machinery |
|---|---|

**Instruction sheet**

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

Completing requirements in preparation for start-up of filling machine

Setting machine requirements correctly

Following start-up procedures

Attaching and changing filling materials to product specifications

Following of OHS, hygiene and sanitation

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:

Complete requirements in preparation for start-up of filling machine

Set machine requirements correctly

Follow start-up procedures

Attach and changing filling materials to product specifications

Follow of OHS, hygiene and sanitation

**Learning Instructions**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”.

4. Try to understand what are being discussed.
5. Ask your trainer for assistance if you have hard time understanding them.
6. Accomplish the “Self-checks” which are placed following all information sheets.
7. 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).
8. If you earned a satisfactory evaluation proceed to “Operation sheets
9. Perform “the Learning activity performance test” which is placed following “Operation sheets”
10. If your performance is satisfactory proceed to the next learning guide,

If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

**Information sheet 1 Completing requirements in preparation for start-up of filling machine**

### 1.1 Set out in standards requirements and codes of practice

Selecting machine to be operated and completion necessary for installation to equipment

#### 1.1.2 Filling machine hydraulic sausage filler to correct specifications

Clean this new equipment thoroughly before using for hygiene. Clean all parts that contact food directly like the cylinder nozzle plunger etc. Clean with brush/cloth and suitable detergent that approved for use with meat processing equipment.

**Figure. 19 Hydraulic piston fillers Mod. Economical 20L 30L 50L**

Operation/Disassembly this equipment as per following steps

1) Firstly: Put hand crank on fast speed gear system and rotate it in clockwise to rise up plunger, take the cylinder out to clean and take the plunger off for cleaning.

2) After cleaning finished, put the plunger back to original position. Please make sure that it is locked well. Fit nozzle on the outlet of sausage and locked by locking nut, load meat into cylinder, put it in place.

1.4 **Preparing the safety and PPE material for operation.**

**Figure 20 personal protective equipment**

**Self-check 1**

**Name** _____ **ID:** _____ **Date** _____

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

**Test 1. Written test**

1. Demonstrate how to preparing 5 Lb. Stainless Steel Sausage Stuffer for start up
2. Demonstrate how Hydraulic Piston Sausage Filler Mod. Economical 20l 30l 50l machine prepared for startup.

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note**:* Satisfactory > points Unsatisfactory - < points

setting machine set according to machine type and specification. Setting machine for automatic and manual is different. In this section we see how to setting for two equipment.

**2.1 Setting Hydraulic Piston Sausage Filler Mod. Economical 20l 30l 50l**

1. These machines essentially comprise 8 parts: lid, cylinder, tie rods, hydraulic cylinder, oil tank, manifold with pressure control and motor-pump assembly
2. It is important that when the machine starts working, it is completely clean to ensure its correct functioning.
3. The most appropriate mixtures are generally ones that after being prepared or mixed are kept in the conservation chamber for several hours at temperatures between 0 and 4ºC.
4. The sausage filler operates on three-phase (3 phases + earth) 380 volts 50 Hz current.
5. By changing the connection of the motor and transformer following the diagram, it can work at 220 volts (three phases + earth) at 50 Hz.
6. Adjust all the above incorporated activities

**Setting machine 5 LB. Stainless Steel Sausage Stuffer/filler**

1. Attach the handle with nut, and then turn the handle counter-clockwise so that the piston moves out of the cylinder.
2. Take the cylinder out and put meat inside

**Self-check 2**

**Name** _____ **ID:** _____ **Date** _____

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

Test 1: written

1. Incline the steps of setting Hydraulic Piston Sausage Filler
2. Explain the procedure of setting machine 5 LB. Stainless Steel Sausage Stuffer/filler

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note**:* Satisfactory > points Unsatisfactory - < points

**Information sheet 3 following start up procedure**

### 3.1 following start up procedure of hydraulic filler

1. The knee-operated lever has three positions (forward, dead center and back).
2. Push the handle forwards, checking that the piston rises. If it does not rise, give it more pressure using the pressure control.
3. With the cylinder lid open, put the seal in place overview). We recommend dampening it with water before fitting it.
4. Fill the cylinder with the mix you are going to use, pushing it down to ensure there are no air pockets.
5. Close the lid lifting it slightly. Raise the folding tie rod and do up the four nuts tightly by hand

### 3.2 following start up procedure of 5 LB. Stainless Steel Sausage Stuffer/filler

This sausage stuffer is shipped with the piston in the fully lowered position, to raise the piston plug the power cord into a serviceable approved 110-volt 60hertz outlet.

1. Place the foot
2. control pad in a dry comfortable position and place your foot on the pad and apply pressure
3. to the up pedal, the piston will begin to rise. By removing your foot from the control pad, the unit will stop.
4. Completing activity for startup of 5 LB. Stainless Steel Sausage Stuffer/filler
5. Clean the parts with soap and water, and affix the tube

**Figure 21. 1. Place the foot on piston plug**

### 3.3 Work effectively in a range of situations as an individual and as a team member work to production speed

Effective workers get exciting projects, win important clients, and are well respected by their colleagues and bosses. But how can you become more effective, and make sure that you don't miss out on these great opportunities? And what should you focus on?

This is what we'll be exploring in this article. We'll look at the skills you can develop in order to become more effective at work, and we'll review strategies and resources that you can use to increase your effectiveness.

There is a big difference between working as a group and working as a team. A group is individual people who coordinate their individual efforts to achieve a goal. A team is a group of people with a shared goal who work together to achieve it.

### A. Identify Priorities

If someone asked you what your job was truly about, would you have a good answer? One of the most crucial steps in becoming fully effective is to know your purpose at work. After all, if you don't know what your job is there to achieve, how can you set appropriate priorities? (If you don't set priorities, you'll be forever buried under a mountain of work, unable to tell the difference between what's important, and what isn't.)

To identify your job's true purpose and define what you need to achieve in your current position, perform a job analysis . This will help you uncover your most important objectives, so that you can start prioritizing tasks effectively.

B. **Adopt a Good Attitude**

Effective workers have a "good attitude." But what does this really mean? People with a good attitude take the initiative whenever they can. They willingly help a colleague in need, they pick up the slack when someone is off sick, and they make sure that their work is done to the highest standards. "Good enough" is never quite good enough for them.

**C. Build Essential Skills**

Chances are that you have a lot of competing demands on your time. One of the best ways of becoming more effective at work is to learn how to manage your time more efficiently. Other key areas include learning how to manage stress, improving your communication skills, and taking action on career development. All of these can have a major impact on your effectiveness at work.

**D. Time Management/Productivity**

Probably the most crucial thing that you can do to become more effective at work is to learn how to manage your time. Without this skill, your days will feel like a frantic race, with every project, and phone call competing for your attention.

Start by looking at your daily schedule. Do you know how you spend your time every day? If not, the answer might surprise you! Use an Activity Log to analyze how much time you're devoting to your various tasks, like meetings, checking email, and making phone calls. It can be an eye-opening experience to look at this objectively, especially if you discover that you're spending lots of time on tasks that don't help you meet your objectives.

**Self-check 3**

**Name** _____ **ID:** _____ **Date** _____

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

Test1: written

1. What is the following start up procedures of hydraulic filler?
2. What is the following start up procedures of 5 LB. Stainless Steel Sausage Stuffer/filler?

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note**:* Satisfactory > points Unsatisfactory - < points

**Information sheet 4 Attaching and changing filling materials to product specifications**

### 4.1 Attaching filler nozzle to nut

Close the lid lifting it slightly. Raise the folding tie rod and do up the four nuts tightly by hand. Attach the outlet funnel of the appropriate diameter for the product you wish to make and tightly fasten the nut for changing nozzle of Hydraulic piston filler.

**Figure 22. Attaching filler nozzle to nut**

**Matching specific attachment with nozzle**

Select the proper stuffing tube for the size casing you are going to fill. Follow the casing manufacture guidelines for flushing or the need to soak the casings.

**Loading the for filling**

1. Grind and mix your seasonings per instructions and then place the meat into the Stainless steel cylinder making sure not to create air pockets.
2. This stuffer is equipped with a pressure relief valve located on the piston, it should be checked for movement approximately 3/16 up and down. This will also help to prevent blow outs in the casing.
3. Put the stuffer cylinder in place; making sure it's locked under the pillar ears and then line the cylinder up with the piston.

4. Push the down side of the foot pad, the piston will start to come down. If the piston is coming down too fast use the knob on the side of the motorized box to adjust to a comfortable speed. If you need to stop at any time simply lift your foot off the pedal, and to resume stuffing push back down on the foot pedal. While filling the casing keep an eye on the remainder of casing to be filled, when you are about done filling remove your foot from the foot pad, the piston will

**Self-check 4**

**Name** _____ **ID:** _____ **Date** _____

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

Test 1: written

1. How Attaching filler nozzle to nut?
2. How Loading the material for filling?

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note**:* Satisfactory > points Unsatisfactory - < points

**Information sheet 5: Following of OHS hygiene and sanitation** 5.1

5.1 **Occupational Health and Safety for Hydraulic piston filler**

It is forbidden to make any change or modification to the machine without the prior written permission of our technical department. Use of the machine in these conditions could cause accidents, in which case. accepts no liability for improper use of the machine. The machine has been designed for use with food products and must be used in the way described in this manual. Any use other than the specified one will involve risk for the user and for the machine. Industries gasser s.l. accepts no liability either for damage to the machine or personal injury or injury to third parties that this use might cause.

**5.2 Hygiene and Sanitation**

This means that all of the types of steel and plastic from which the machine is constructed and which are in contact with the meat comply with the hygiene rules and regulations in force.

All of the materials used in the manufacture of the machine and which come into contact with food comply with Regulation 1935/2004. Consequently, the machine has the Europe Commission trade mark. It is not recommended to use detergents containing chlorine, any of its derivatives or any other product that could damage the construction materials of the machine. Removable cylinder for cleaning.

**5.3 Occupational Health and Safety for 5Lb. Stainless Steel Sausage filler**

Any time the piston is raised out of the cylinder, release the handle slowly! Pressure or gravity could cause the handle to spin back slightly causing injury. Read carefully and understand all instructions before operating. Failure to follow the safety rules and other basic safety precautions may result in serious personal injury. Save these instructions in a safe place and on hand so that they can be read when required. Keep these instructions to assist in future servicing. Wear all PPE recommended in previous information.

**Self-check 5**

**Name** _____ **ID:** _____ **Date** _____

**Operation sheet 2: preparing of hydraulic piston sausage filler and 5lb stainless steel filler for filling**

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

Test 1: written

1. What is the hygiene and sanitation requirements of your machine?
2. What is the OHS frighten to 5lb. stainless steel stuffer?

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note**:* Satisfactory > points Unsatisfactory - < points

**I. Sequence of activity enabling preparation of hydraulic piston filler for filling casing is as follows.**

1. changing the connection of the motor and transformer following the diagram, it can work at 220 volts (three phases + earth) at 50 Hz. The sausage filler operates onthree-phase (3 phases + earth) 380 volts 50 Hz current.
2. Press the start button and the motor and hydraulic pump will start to work.
3. Open the machine's lid. To do so, loosen the four nuts, fold down the hinged tie rod and turn the lid, lifting it slightly.
4. The knee-operated lever has three positions (forward, dead center and back). Push the handle forwards, checking that the piston rises. If it does not rise, give it more pressure using the pressure control.
5. With the cylinder lid open, put the seal in place. We recommend dampening it with water before fitting it.
6. Fill the cylinder with the mix you are going to use, pushing it down to ensure there are no air pockets.
7. Close the lid lifting it slightly. Raise the folding tie rod and do up the four nuts tightly by hand.
8. Attach the outlet funnel of the appropriate diameter for the product you wish to make and tightly fasten the nut. https://www.youtube.com/watch?v=cw-SOasTg7w

## II. Sequence of activity enabling preparation of 5 LB. Stainless Steel

**Necessary material for operation:**

- PPE: water proof wearing, water proofing shoes, face and head cover
- mild hot water,
- detergent; soap, cleaning powder

**Sausage Stuffer for filling casing is as follows.**

Step 1: Clean the parts with soap and water, and affix the tube.

Step 2: Attach the handle with nut, and then turn the handle counter-clockwise so that the piston moves out of the cylinder.

Step 3: Take the cylinder out and put meat inside.

Step 4: Attach the nozzle specified for product casing

Step 5: Put the cylinder back.

**https://www.youtube.com/watch?v=AdrsVQwVwFE**

**LAP TEST: preparing filling machinery**

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

**Instructions**:

1. Use PPE recommended in your information sheet.
2. Carryout any OHS regulation your information sheet for boiler operation
3. Given necessary prototypes, tools and materials you required to perform the following tasks within 30minutes for each machine.
4. The project is expected from each student to do it.

**Task 1.** Perform preparation of hydraulic piston sausage filler and 5LB. Stainless Steel stuffer machine

| LG 41 | LO#4: Fill Casings and Clean Equipment |
|---|---|

**Instruction sheet**

This learning guide is developed to provide you the necessary information regarding the following

content coverage and topics:

- Selecting appropriate casings and filling nozzle
- Loading Filler and filling casings
- Identifying, removing and reporting defective
- Cleaning equipment

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:

- Select appropriate casings and filling nozzle
- Load Filler and filling casings
- Identify, removing and reporting defective
- Clean equipment

**Learning Instructions**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”.
4. Try to understand what are being discussed.
5. Ask your trainer for assistance if you have hard time understanding them.
6. Accomplish the “Self-checks” which are placed following all information sheets.
7. 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).
8. If you earned a satisfactory evaluation proceed to “Operation sheets
9. Perform “the Learning activity performance test” which is placed following “Operation sheets”
10. If your performance is satisfactory proceed to the next learning guide,

If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

**Information sheet 1: Selecting appropriate casings and filling nozzle**

According to product specification the nozzle selected. For different product we use different diameter filling tube. Use the following nozzle to fill these products in the table.

**Table 2. Diameter of meat products and filling nozzle**

| No | **Product to be filled** | **Diameter of nozzle select** | **Casing** |
|---|---|---|---|
| 1 | Breakfast Sausage • Small Snack Sticks | 20-22 mm | Sheep casing |
| 2 | Breakfast Sausage • Snack Sticks | 22-24 mm | Sheep |
| 3 | Small Hot Dog • Wiener | 24-26 mm | collagen casing from beef |
| | Large Hot Dog Wiener • Land jaeger | 26-28 mm | collagen casing from beef |
| | Salami | 30-34mm | |

**Figure 23. nozzle diameter difference**

| **Self-check 1** |
|---|

**Name** _____ **ID:** _____ **Date** _____

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

Test 1: written

1. What is the diameter of casing for Breakfast Sausage?
2. What is the diameter of casing for Small Snack Sticks or Breakfast Sausage •?
3. What is the diameter of casing for Snack Sticks Small Hot Dog • Wiener?

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note**:* Satisfactory > points Unsatisfactory - < points

## Information sheet 2: Loading Filler and filling casings

### 2.1 Loading and filling product to cylinder filler

The needed to operate is loaded to operation area safely. Taking filler to filling area with loader because the machine has not a wheel to traveling. If the position nearest to a site location is prefer for all safety and time management. Adding the product to cylinder with lifting material and wearing the food grade glove has obliged for food safety.

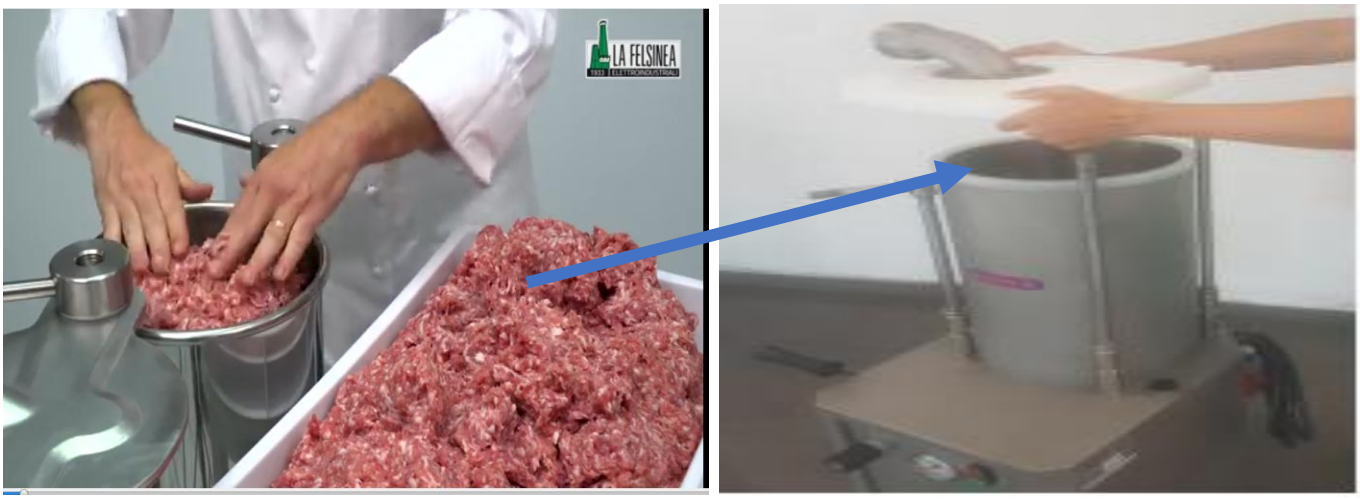


**Figure 24. filling mix to cylinder**

### 2.2 perform filling to required product specifications

#### 2.2.1 Performing filling with Hydraulic piston filler

1. Press the start button and the motor and hydraulic pump will start to work.
2. Open the machine's lid. To do so, loosen the four nuts, fold down the hinged tie rod and turn the lid, lifting it slightly.
3. The knee-operated lever has three positions (forward, dead center and back).
4. Push the handle forwards, checking that the piston rises. If it does not rise,
5. give it more pressure using the pressure control, overview).
6. With the cylinder lid open, put the seal in place. We recommend dampening it with water before fitting it.

7. Fill the cylinder with the mix you are going to use, pushing it down to ensure there are no air pockets.
8. Close the lid lifting it slightly. Raise the folding tie rod and do up the four nuts tightly by hand.
9. Attach the outlet funnel, overview) of the appropriate diameter for the product you wish to make and tightly fasten the nut.
10. Push the knee-operated lever forwards as far as it will go and control the mixture's outflow speed using the pressure control. If you want the mix to come out of the sausage filler at a steady rate, set the knee-operated lever to its point of greatest travel using the throw adjuster screw.
11. When the product is finished, lower the piston, moving the knee-operated lever to the opposite position to the one used for raising it.
12. When the piston is lowered, put the knee-operated lever in dead center (its central position) so that the motor and pump are not harmed. The cylinder can now be refilled.

**2.2.2 Performing filling with 5lb. Stainless Steel Stuffer/Filler/**

Filling has been done as SOP and filled products are handled hygienically according to work place regulation. Steps of filling are as follows.

1. Press the start button and the motor and hydraulic pump will start to work.
2. Push the knee-operated lever forwards as far as it will go and control the mixture's outflow speed using the pressure control.
3. If you want the mix to come out of the sausage filler at a steady rate, set the knee-operated lever to its point of greatest travel using the throw adjuster screw
4. When the product is finished, lower the piston, moving the knee-operated lever to the opposite position to the one used for raising it.
5. When the piston is lowered, put the knee-operated lever in dead center (its central position) so that the motor and pump are not harmed. The cylinder can now be refilled.

**Self-check 2**

**Name** _____ **ID:** _____ **Date** _____

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

Test 1: written

1. Explain and list performing filling of with Hydraulic piston filler?
2. Express how to performing filling with 5lb. Stainless Steel Stuffer/Filler?

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note**:* Satisfactory > points Unsatisfactory - < points

**Information sheet 3: Identifying, removing and reporting defective**

## 3.1 Identifying problem of operation

Troubleshooting of 5lb stainless steel filler

The problem of operations is during operating this equipment are**;**

1. The stuffer is hard to crank; it cannot operate according to before and the product movement is slow.

   **Solution:**

   - Sausage mixture has become too stiff. Add water to mix
   - Add lubricant (mineral oil or vegetable oil) to the piston gasket
   - and the interior of the cylinder.

2. **Meat is passing by the piston**

   **Solution:**

   - Gasket is not installed.
   - Gasket needs to be lubricated

3. **Casings are bursting when filling**

   **Solution:**

   - Casings are old and brittle.
   - Casings were not soaked long enough.
   - Casings were soaked too long.
   - Casings should not have been soaked
   - . 5. Casings were filled too tightly.
   - Stuffing Tube has a burr and is puncturing the casing.
   - Stuffing tube is too large for casings.

## 3.2 Troubleshooting of hydraulic piston

The problem may be occurred during operating this equipment are result on product defects. the problems of operation are discussed below how you solve if those problem faced in operation.

**Table 3: 3.2 Troubleshooting problem and solution of hydraulic piston**

| Problem | Cause | Solution |
|---|---|---|
| The machine does not start | Machine unplugged | See manual ". Start-up", point |
| The mixture escapes through the lid. | The nuts on the tie rods have not been tightened enough. Firmly tighten the nuts by hand. The lid seal is incorrectly located Locate the lid seal correctly and lift the lid when closing it. The lid seal is broken or in poor condition | Firmly tighten the nuts by hand<br>Locate the lid seal correctly and lift the lid when closing it<br>Replace the sea |
| The piston does not rise when the knee-operated lever is pushed forwards | There is no pressure<br>The motor is running backward<br>Oil in poor condition | Raise the pressure with the control<br>Change the oil See manual "Start-up", point |
| The motor is getting very hot. * | he knee-operated lever will not reach the end of its travel and the pressure is very high. | Start-up", point of the machine manual |

## 3.3 Identify Over-Filled and Under-Filled Products

The over filled product will cause for bursting. During smoking and transportation or dividing lose product. They're identifying unfamiliar filling is important. Use measurement and pressure of filling to identifying.

### 3.4. Remove and Report Defective Product According

Sorting the overfilled or filling fault to specified place. Then identifying the faults cause and report to counter for refilling the products.

**Self-check 3**

**Name** _____ **ID:** _____ **Date** _____

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

Test 1: written

1. What is the solution if stuffer is hard to crank?
2. What is the solution if meat is passing by the piston?
3. What is the cause if machine does not start?
4. What is the cause the motor is getting very hot?
5. What is the cause of piston does not rise when the knee-operated lever is pushed forwards?

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note**:* Satisfactory > points Unsatisfactory - < points

**Information sheet 4 Cleaning equipment**

### 4.1 CLEANING

Suitable detergent that approved for use with meat processing equipment.

### 4.2 cleaning hydraulic piston

**1**. When all of the mixture has been used, stop the sausage filler. Set the sausage filler to full pressure and withdraw the rod until it draws out all of the mixture that was in the outlet funnel

2. To remove the lid, first remove the outlet funnel by loosening its nut. Then remove the four nuts from the tie rods. Finally, remove the seal

**Figure 25. removing the lid**

**3. Next, remove the cylinder**

**3.1.** First, with piston lowered, release the bosses on the cylinder from the slots at the base of the tie rods by turning it anti-clockwise.

**3.2.** Next, turn the machine on and raise the piston until the bosses line up with the upper grooves on the tie rods. In this position, turn the cylinder clockwise and fit the bosses into the upper slots**.**

3.3. Finally, lower the piston and the cylinder will be removed.

4. Once the lid and the cylinder have been removed, the removed parts can be cleaned pressurized water and any neutral detergent. Clean the machine's chassis and electric controls with a damp cloth. Never clean them with pressurized water. We recommend drying the machine once you have finished cleaning it.

5. When the cleaning is completed, the machine can be reassembled by following the process described above in reverse order.

**4.3 Cleaning of 5lb. Stainless Steel Sausage filler**

**1.** Get rid of handle

2. Take away piston

3. Remove cylinder

4. Clean the parts with soap and water, and affix the tube.

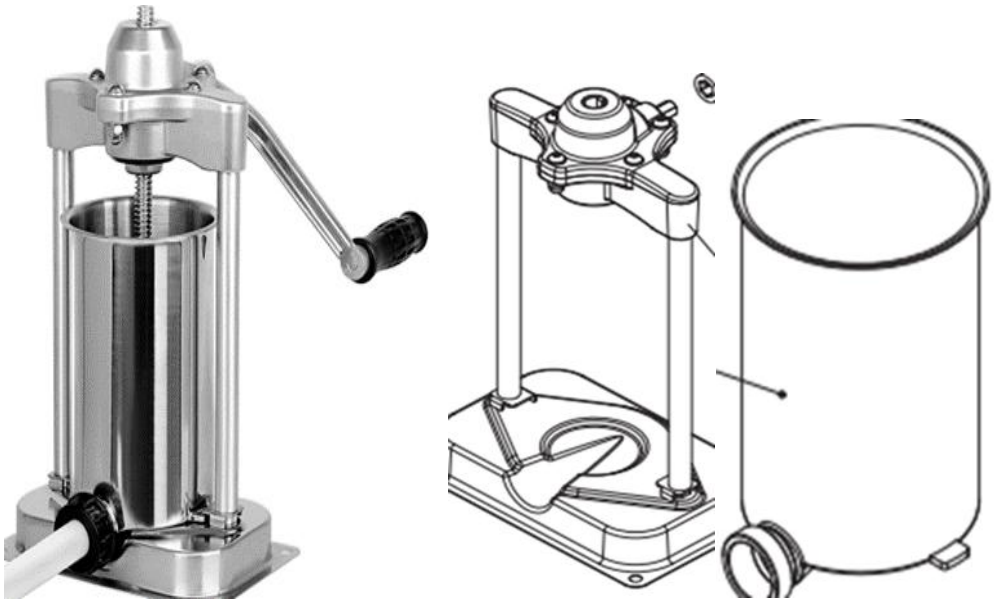

**Figure 26. main parts of 5LB stainless steel stuffer**

**Self-check 4**

**Name** _____ **ID:** _____ **Date** _____

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

Test 1: written

1. Discuss the cleaning process of hydraulic piston.
2. Discuss the cleaning steps for 5LB stainless steel.

**Answer Sheet**

Score = _____

Rating: _____

Trainer Name: _____ Date: _____

***Note**:* Satisfactory > points Unsatisfactory - < points

**Operation sheet 3: Loading Filler and filling casings**

**Steps and procedure of loading and filling of hydraulic piston filler**

**Material needs**: driver equipment, minced meat, casing, PPE such as glove (food grade), apron, waterproof shoes, lifting equipment.

**Step1**. check that it is in perfect conditions, without any damage, dents or knocks.

**step2**. Press the start button and the motor and hydraulic pump will start to work.

**Step3**. Open the machine's lid. fold down the hinged tie rod and turn the lid, lifting it slightly.

**Step4.** The knee-operated lever has three positions (forward, dead center and back). Push the handle forwards, checking that the piston rises.

**Step5**. With the cylinder lid open, put the seal in place.

**Step6**. Fill the cylinder with the mix you are going to use,

**Step7.** pushing it down to ensure there are no air pockets.

**Step8**. Close the lid lifting it slightly. Raise the folding tie rod and do up the four nuts tightly by hand.

**Step9**. Push the knee-operated lever forwards as far as it will go and control the mixture's outflow speed using the pressure control.

**Step10**. Set the knee-operated lever to its point of greatest travel using the throw adjuster screw.

**Step11**. moving the knee-operated lever to the opposite position to the one used for raising it.

**Step12**. put the knee-operated lever in dead center

**step13**. cleaning with water and neutral detergent all parts that have been in contact with the mix.

**LAP TEST : perform loading and filling**

**Name……** **ID……..**

**Date……**

**Time started: _____ Time finished: _____**

**Instructions:**

1. Use PPE recommended in your information sheet.
2. Apply OHS regulation of your information sheet for boiler operation
3. Given necessary prototypes, tools and materials you required to perform the following
4. Apply hygienic and sanitation requirements
5. The project is expected from each student to do it. Tasks within 20minutes for each task**.**

**Task 1:** perform loading hydraulic piston filler

**Task 2:** perform filling casing sausage with hydraulic piston filler

| Reference Material |
|---|

**Website address of PDF**

4. **https://www.gaser.com/download.php?file=bkZGYTlqa2UzRGcvZitrUHFCTUErZzI4T0x6RlZ4ZDJTbU0wTE5GVFlzbnU4RTJqWEVGY1NVR3ZYcWpFWVlXNTo6PDIlKdV2AXV-o04htGCFlw||**
5. **https://www.gaser.com/download.php?file=bkZGYTlqa2UzRGcvZitrUHFCTUErZzI4T0x6RlZ4ZDJTbU0wTE5GVFlzbnU4RTJqWEVGY1NVR3ZYcWpFWVlXNTo6PDIlKdV2AXV-o04htGCFlw||**

6. https://www.gaser.com/download.php?file=bkZGYTlqa2UzRGcvZitrUHFCTUErZzI4T0x6RlZ4ZDJTbU0wTE5GVFlzbnU4RTJqWEVGY1NVR3ZYcWpFWVlXNTo6PDIlKdV2AXV-o04htGCFlw|
7. https://www.gaser.com/download.php?file=bkZGYTlqa2UzRGcvZitrUHFCTUErZzI4T0x6RlZ4ZDJTbU0wTE5GVFlzbnU4RTJqWEVGY1NVR3ZYcWpFWVlXNTo6PDIlKdV2AXV-o04htGCFlw|
8. hhttps://www.%20FILL%20CASING/Small-scale%20sausage%20production.html

**Website address of videos**

1. https://www.youtube.com/watch?v=gTUib22Dtew
2. https://www.youtube.com/watch?v=cw-SOasTg7w
3. https://www.youtube.com/watch?v=p4SVpP14zFU
4. https://www.youtube.com/watch?v=Be1dK0BFo8c
5. https://www.youtube.com/watch?v=vVUJY7ixPeo
6.

**AKNOWLEGDEMENT**

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**ANSWER KEY**

LG38:

SELF SCHECK 1.

T1 Answer

1. D

2. E

T2 1. synthetic thermoplastic materials Suitable materials are Polyamide (PA), Polyethylene (PE), Polypropylene (PP), Poly vinylidene chloride (PVDC) and Polyester (PET).

T2.2 Have a strong distinct odor that isn't pleasant.

Self-check 2

Test 1. 1.true, 2: true

test2 1.1. a, 2.d

self-check 3

Answer

1 Graying, Cloudy Casings, Threads of connective tissue, or whiskers, Splitting Casings, Wrinkling, Streaking

2. Don't overstuff. Make sure stuffed circumference matches manufacturer's recommended measurements.

3. Problem: Visible threads of fatty connective tissue, or whiskers, appear on inside curve of casing as a result of processing hog casing with a knife.

Self-check 4

Test 1: 1.d, 2.d

Self-check 5

Test 1: choice

1.c, 2.d

Test 2: sheep

Self-check 6

Test 1; True or false

3. False, 2. true

Test 2: 1. Rinse casing well with potable water, Lay the casing in lukewarm water for 15 to 30 minutes prior to use. This will soften the casing and make it more workable.

Self-check 7

Test 1: 1. For rinse or to remove brine, cleaning with water.

4. 15-30minutes

Self-check 8

TEST 1: 1.A, 2.D

Self-check 9

Test1: written test

1. A person to be suffering from, or to be a carrier of a disease or illness likely to be transmitted

2. Controlling is practicable throughout the whole food chain

3. a species other than that which is in the product or if the source of the collagen from made

Self-Check 10

Test 1: true or false

6. true.

7. true

8. true

Test 2

9. The best way to preserve natural casings is to keep them in an airtight bag (vacuum sealed) or container

10. there are two ways to use salt. One is a wet salt called brine and the other is dry called granulated.

**LG39 LO#2**

Self Check 1

TEST1: 1. true, 2. False

1. Test 2: 1. Provide visual control of activities, use space efficiently, use labor efficiently, eliminate bottlenecks, it is environmentally friendly, work speed to production.

2. Eliminate bottlenecks is save from injury or fail, environmentally friendly satisfy worker coding to safety

Self-check 2

Test 1. Choice

1. D, 2.D.

TEST 2. 1. 10+2.5*50=135BIRR, 135B/30kg=4.5B/kg

2.80birr-4.5=75.5birr

Self-check 3

Test 1: 1. B, 2.D, 3.C

SELF CHECK 4

TEST 1. 1.true, 2. false

Test 2.1 promote bacterial growth and damage the strength

SELF CHECK 5

TEST 1: TRUE OR FALSE

1.true, 2. false, 3. true, 4. true, 5. true

Self-check 6.

1.to handling the product from tube into casing

2. bursting, contamination, break etc.

Self-check 7.

Test 1: 1. true, 2. true, 3. True.

Self-check 8

Test 1: 1. true,2. true

Test 2: 1.D, 2. G, 3. D,

SELF CHECK 9

TEST 1: TRUE OR FALSE

4. False, 2. True, 3. False

LG 40 LO#3

Self-check 1

1. Firstly: Put hand crank on fast speed gear system and rotate it in clockwise to rise up plunger, take the cylinder out to clean and take the plunger off for cleaning.

After cleaning finished, put the plunger back to original position. Please make sure that it is locked well. Fit nozzle on the outlet of sausage and locked by locking nut, load meat into cylinder, put it in place

2. Clean this new equipment thoroughly before using for hygiene. Clean all parts that contact food directly like the cylinder nozzle plunger etc. Clean with brush/cloth and suitable detergent that approved for use with meat processing equipment

Self-check 2

Test 1.

1.

- ✓ These machines essentially comprise 8 parts: lid, cylinder, tie rods, hydraulic cylinder, oil tank, manifold with pressure control and motor-pump assembly
- ✓ It is important that when the machine starts working, it is completely clean to ensure its correct functioning.
- ✓ The most appropriate mixtures are generally ones that after being prepared or mixed are kept in the conservation chamber for several hours at temperatures between 0 and 4ºC.

- 2.

- ✓ Attach the handle with nut, and then turn the handle counter-clockwise so that the piston moves out of the cylinder.
- ✓ Take the cylinder out and put meat inside

Self-check 3

Test 1.

1.

- ✓ The knee-operated lever has three positions (forward, dead center and back).
- ✓ Push the handle forwards, checking that the piston rises. If it does not rise, give it more pressure using the pressure control.
- ✓ With the cylinder lid open, put the seal in place overview). We recommend dampening it with water before fitting it.

2.

- ✓ Place the foot
- ✓ control pad in a dry comfortable position and place your foot on the pad and apply pressure
- ✓ to the up pedal, the piston will begin to rise. By removing your foot from the control pad, the unit will stop.

Self-check 4

Test 1: 1. Close the lid lifting it slightly. Raise the folding tie rod and do up the four nuts tightly by hand and Attach to outlet funnel

2. then place the meat into the then place the meat into the Stainless-steel cylinder making sure not to create air pockets Stainless steel cylinder making sure not to create air pockets

self-check 5

test 1:

1. It is not recommended to use detergents containing chlorine, any of its derivatives or any other product that could damage the construction materials of the machine. Removable cylinder for cleaning.

2. Pressure or gravity could cause the handle to spin back slightly causing injury.

**LG 41: LO4**

**Self-check 1**

**Test** 1: 1. 20-22 mm

2. 22-24 mm

3. 24-26 mm

**Self-check 2**

Test 1: 1:

- ✓ Press the start button and the motor and hydraulic pump will start to work.
- ✓ Open the machine's lid. To do so, loosen the four nuts, fold down the hinged tie rod and turn the lid, lifting it slightly.
- ✓ The knee-operated lever has three positions (forward, dead center and back).
- ✓ Push the handle forwards, checking that the piston rises. If it does not rise,
- ✓ give it more pressure using the pressure control, overview).
- ✓ With the cylinder lid open, put the seal in place. We recommend dampening it with water before fitting it.
- ✓ Fill the cylinder with the mix you are going to use, pushing it down to ensure there are no air pockets.

2.

- ✓ Press the start button and the motor and hydraulic pump will start to work.
- ✓ Push the knee-operated lever forwards as far as it will go and control the mixture's outflow speed using the pressure control.
- ✓ If you want the mix to come out of the sausage filler at a steady rate, set the knee-operated lever to its point of greatest travel using the throw adjuster screw
- ✓ When the product is finished, lower the piston, moving the knee-operated lever to the opposite position to the one used for raising it.
- ✓ When the piston is lowered, put the knee-operated lever in dead center (its central position) so that the motor and pump are not harmed

Self-check:3

Test 1: 1.

- ✓ Sausage mixture has become too stiff. Add water to mix
- ✓ Add lubricant (mineral oil or vegetable oil) to the piston gasket and the interior of the cylinder

2.

- ✓ Gasket is not installed.
- ✓ Gasket needs to be lubricated

3.Machine unplugged

4.he knee-operated lever will not reach the end of its travel and the pressure is very high.

Self-check 4;

Test 1: 1.

- ✓ To remove the lid, first remove the outlet funnel by loosening its nut
- ✓ Next, remove the cylinder
- ✓ Once the lid and the cylinder have been removed, the removed parts can be cleaned pressurized water and any neutral detergent.
- ✓ When the cleaning is completed, the machine can be reassembled by following the process described above in reverse order.

2.

- ✓ Get rid of handle
- ✓ Take away piston
- ✓ Remove cylinder
- ✓ Clean the parts with soap and water, and affix the tube