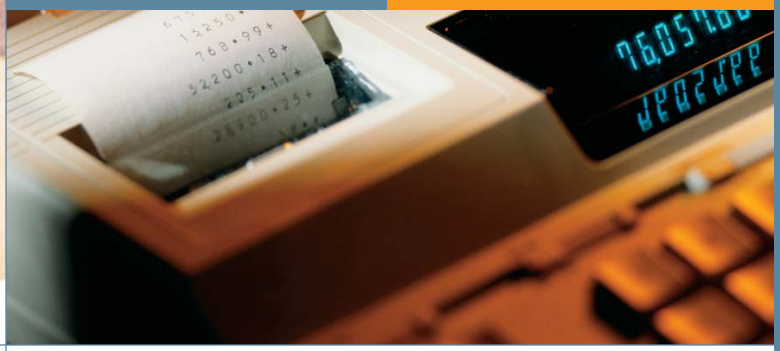
The Ground Meat Management Manual

for retail meat operations

FOOD SAFETY

QUALITY

PROFITABILITY



GROUND MEAT MANAGEMENT CHECKLIST

CANADA BEEF™

Note: Please note that this resource was produced in 2008 and some information may no longer be applicable.

The Ground Meat Management Manual

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The Ground Meat Management Manual

Ground products play a central role in achieving profitability for the meat department. Their contribution is both direct, through sales of items such as ground beef, and indirect, through their ability to generate traffic flow and sales of other items in the retail meat operation.

Sustaining the profitability of this category as well as ensuring quality and safety is best achieved through a systematic effort. *The Ground Meat Management Manual* is a resource which is devoted to the illustration of key factors for consideration by management from ingredient purchasing to sale.

At the conclusion of this manual, you are invited to complete the *Ground Meat Management Checklist*. While not all aspects of this self evaluation are equally applicable to each operation, they are designed to highlight factors which contribute to the ongoing success of the majority.

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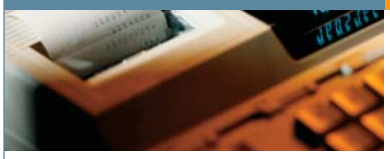


APPENDIX

Cover: Food Safety photo by Keith Weller ARS/USDA.

Managing Food Safety

Ground Meat Safety

Epidemiological data supports a greater incidence of foodborne illness associated with ground meat items versus whole muscle cuts. There are two primary reasons for this finding. Firstly, grinding meat creates additional surface area and disrupts cell membranes which increases the availability of nutrients and promotes growth of bacteria. Secondly, grinding spreads microorganisms throughout the product including the centre which remains much cooler during cooking than the exterior surfaces.

While most organisms which can grow inside ground meat products are not harmful, some like *E. coli* 0157:H7 can cause serious illness. Although ground meats do pose a greater risk than items made from whole muscle, it is clear that the safety record is still very strong. In fact, the odds of becoming ill from *E. coli* 0157:H7 due to the consumption of ground beef is less than 1 in a million per serving.

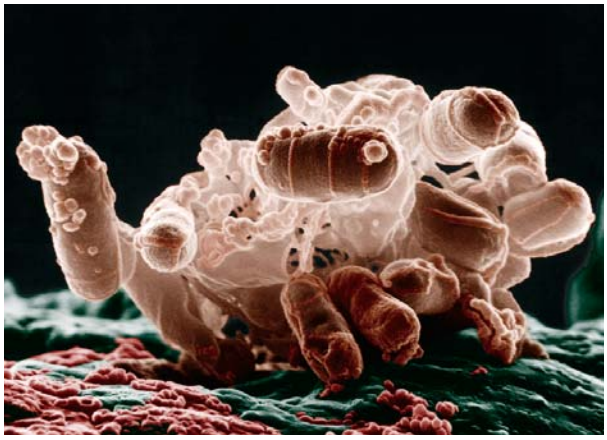
Enhancing Food Safety

While these statistics are encouraging, there is still an opportunity for additional progress. This requires that the potential sources of microorganisms in ground meat be addressed in a systematic way. This process begins on the slaughter floor with the increasingly sophisticated approaches utilized by Canadian processors including carcass pasteurization and the use of steam or organic acid washes. Following slaughter, it is important to prevent additional organisms from the environment, equipment and personnel, from contacting ground meat products. In addition, it is vital to prevent organisms which may be present from growing on food contact and meat surfaces by controlling temperature.

Equipment and Environmental Sanitation

Sanitation refers to the combined process of cleaning and disinfecting. The role of sanitation is critical in that grinders and other food contact surfaces can be sources of foodborne pathogens. A condition known as biofilm formation may occur over time if equipment is not properly cleaned. In this circumstance, bacteria can colonize even stainless steel surfaces in accumulations of hardened organic materials which may be invisible to the human eye. These deposits can protect microorganisms from the action of chemicals used to disinfect or sanitize equipment.

It is also important to maintain the processing environment (floors, walls, ceiling and other infrastructure) in a manner which will prevent these surfaces from becoming additional sources of contamination. The cold temperatures which are maintained in meat operations limit the growth of most bacteria, but some organisms, such as *Listeria monocytogenes,* can grow in refrigeration conditions.



Escherichia coli, seen here using a electron microscope. Some forms such as E. coli 0157:H7 can cause a severe form of foodborne illness.

Photo by Eric Erbe, Colourization by Christopher Pooley ARS/USDA.

Personnel Hygiene

Humans can also transfer potentially harmful organisms into ground meat products directly or onto food contact surfaces. It is important for all staff to understand that any illness involving symptoms such as diarrhea or excessive sneezing or coughing presents a potential food safety hazard. Washing hands after touching unclean surfaces or going to the washroom is an essential control measure. Any sores or cuts must be covered with dry, tight fitting bandages and gloves worn when hands are affected. Disposable gloves should be checked periodically to ensure they are free from tears. Hair nets, and when applicable, beard nets are recommended.

Temperature Monitoring

It is not surprising that most bacteria which can cause illness in humans grow best at the temperatures maintained within our bodies, around 37°C. In fact, the most common sources of foodborne illness associated with ground meat, including *Salmonella, Campylobacter* and harmful types of *E. coli*, cannot grow to any significant extent at recommended refrigeration temperatures (4°C or lower). However, because these organisms grow by doubling, large increases can occur in relatively short periods when temperatures exceed the recommended level. Maintaining the cold chain at all times is therefore essential.

Remember that while maintaining ground meat products and food contact surfaces at 4°C or lower controls the growth of potentially harmful bacteria, it does not kill them. Further, unlike steaks or roasts where the centre of the product is essentially sterile, the majority of the bacteria in ground meat are in the interior. While it is most often impractical to penetrate retail packaging to measure internal temperatures, keep in mind that surface readings have limitations.

Physical and Chemical Hazards

In addition to controlling biological hazards such as bacteria, the safety of ground meats also depends on measures to prevent chemical or physical hazards. Chemical hazards can result when cleaning chemicals contact packaging or products while physical hazards are often associated with bone chips or metal fragments. Regardless of the type of hazard, the best way to address them is to systematically review the production process and identify key good manufacturing practices (GMPs). Accordingly, the remainder of this first section of the manual will be devoted to the description of GMPs and to provide you with the opportunity to evaluate your operation using the *Ground Meat Management Checklist*.

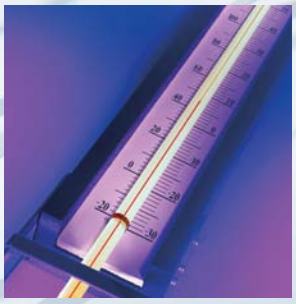
Time for *E. coli* 0157:H7 on surfaces to double

Meat left on the loading dock on a sunny day 25° Celsius:

45 minutes

Surface of a grinder in a room kept at 10° Celsius:

8 hours



Packages of ground meat in the counter above the load-line at 8° Celsius:

17 hours

Good Manufacturing Practices

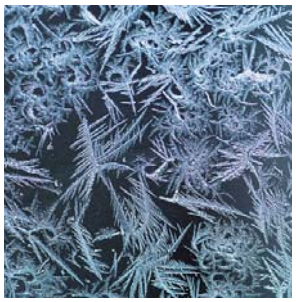
The most effective way to ensure the safety of ground meat products is not through any single intervention, but rather through a continuous commitment to good manufacturing practices. The most important elements contributing to product safety are outlined below for each process step.

Receiving

Loading dock areas should be periodically cleaned and garbage removed daily to ensure adequate sanitation. Trailers delivering meat products should be examined to ensure the trailer walls, ceiling and floors are clean and in satisfactory condition and that the refrigeration unit is functioning adequately. Whenever possible, monitoring devices such as temperature recorders should be used to provide information on transit conditions.

Product should be inspected for signs of contamination, damage to packaging or indications of temperature abuse. Meat ingredients and other perishable items should be moved promptly off the loading dock into refrigerated or frozen storage. Dock seals or other methods should be employed to ensure adequate temperature control is maintained during unloading.

Storage and Selection of Ingredients



Stored ingredients must be maintained at 4°C or lower in bins, under peach paper or in bags until use. Be certain that pallets and shelves are free from physical hazards such as loose nails and broken boards. Coolers should be maintained to prevent excessive condensation or any unsanitary conditions. Ingredients should never be located in an area used for locker rooms, washrooms, garbage, chemical storage or in mechanical rooms.

When selecting ingredients ensure that product is within shelf-life specifications and that it is selected on the basis of a first in-first out inventory system. If whole muscle products are taken from the counter for grinding, always make certain they are free from seasoning and are not past their "best before" date. Do not mix any remaining ground product into another's days production. Purchase all ingredients from a facility which has a documented system for ensuring food safety.

Ingredient Inspection

Ingredient packaging should be inspected to determine if there are any rips, tears or signs of temperature abuse before opening. Take special care to ensure that clips removed from chubs do not enter product. Inspect meat for off-odour, excess purge, bone-chips, cartilage, or any other condition which would make it unsatisfactory for use. Trim or other ingredients which contact any unclean surfaces should be thrown away.

Grinder Preoperational Inspection

To prevent physical, chemical or biological hazards from being introduced into ingredients used for ground meat production, a preoperational inspection is necessary. Ensure that all bolts, pins, or other small parts removed during disassembly are present and securely fastened. Make certain the grinder is free of excessive rust, water, flaking paint, visible meat residues, or any other condition which could contaminate product. Inspect grinder components, especially the grinding knife and plate for evidence of excessive wear or other conditions which could lead to metal particles entering product or difficulty in cleaning.

Disassemble, clean and sanitize the grinder before operation each day or more often if required. If possible, use a separate grinder for each species, otherwise a complete cleanup is required when switching species.

Ground Meat Production

Whenever possible grind only what is required in the next few hours. Grind meat in areas where the room temperature is not more than 10°C or whenever possible 4°C or colder. Particular attention should be devoted to keeping ground meat at 4°C or less as the temperature of the meat will rise during grinding due to heat generated from friction. A grinding log can be used to document the source of meat ingredients as well as other aspects of food safety and quality (for sample see appendix II).

Packaging Ground Meat

As food packaging contacts ground meat directly it must always be kept clean, covered and free of any potential contamination. Ensure that packaging is protected during cleaning activities to prevent chemicals or spray from contaminating soaker pads, trays and wrap. Packaging should not be placed in areas with chemicals, change rooms or where pests may contact it. Inspect packaging before use and always throw away any materials which may have contacted the floor or other unclean surfaces.

When placing ground meat products into styrofoam trays be aware of the potential for contamination which can result from stacking the tray on the top of the meat surface of the tray beneath. Also, when placing trays on larger metal or fiberglass trays which are placed in a rack, ensure that the underside of the large tray is clean and dry to avoid contamination from falling on the meat in the tray below. Make certain that packaging is tight and maintains an effective seal which will not permit leakage of meat juices. Following packaging, ground meat should be placed into refrigerated display or storage as soon as possible.

Display Case Sanitation and Maintenance

Display cases should be cleaned at least once per week, and inspections conducted to determine if more frequent cleaning is required due to leaking packages or other sources of contamination. When maintenance or repair of refrigeration systems is required, it is essential that food products contained in the case be removed or adequately protected against contamination or a rise in temperature. Temperature measurement devices within the display case should be periodically checked to ensure proper function and accuracy.

Ground Meat Display

Do not exceed load line limits as packages may approach the temperature of room air as warm drafts created by passing consumers and the overall store temperature prevent effective cooling. To ensure product safety, temperature of cases should be monitored at least three times per day. Periodic inspection of the display case should also be performed to ensure there is no leaking, damaged packaging or other conditions which might permit contamination. Product should be monitored to ensure no outdated inventory has been left on display. If meat product is left outside of the display case or in an abandoned shopping cart, the product should be destroyed.

Consumer Education

When possible, a sign explaining the meaning and importance of "packaged on" and "best before" dates should be posted along with the significance of these dates if meat is frozen or used fresh. Additionally, consideration may be given to the periodic display of resources available from associations and the government which provide guidance to consumers on how to prepare and handle ground meats safely. Given the essential role of digital meat thermometers for food safety, it would be beneficial to stock these items for purchase by consumers.

Safe handling labels should be applied to ground meat products including recommended cooking temperatures. While presently this is done on a voluntary basis, Health Canada is proposing that mandatory safe handling labels be required on all ground meat and poultry products.

Recall Preparedness

Any complaints related to food safety should be recorded. Ensure that all suppliers have a written recall program and have a list of supplier contact information available at all times. A plan to dispose of any product which has been recalled should be developed. Adequate records of inventory must be maintained in the event that it is necessary to track product.

Developing HACCP Based Food Safety Systems

A key aspect of successful food safety management is to ensure that good manufacturing practices are consistently maintained. The best way to achieve this is to make a "system" which outlines the actions which are required and documents that goals have been achieved. The most widely recognized approach relies on what is known as a Hazard Analysis and Critical Control Point (or HACCP) system to control food safety hazards. The development of a HACCP based system requires building two components, the *prerequisite programs* and *HACCP plans*.

Prerequisite Programs

Prerequisite programs are generally constructed to target hazards which are common to many production processes. Prerequisite programs provide the foundation upon which HACCP based food safety systems are built. Although the number and descriptions of prerequisite programs vary between operations, the nine listed below is a recommended approach.

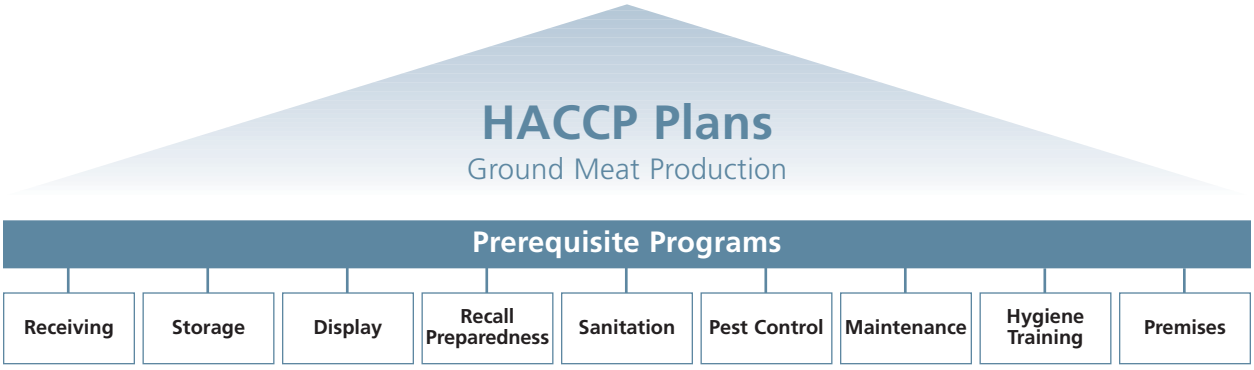
Prerequisite	Program Major Function
Receiving	Inspection of trailers and products upon arrival to ensure food materials and packaging are suitable for use.
Storage	Control of hazards which may occur during storage of meat and packaging.
Display	Ensures food safety requirements are met during display of products for retail sale.
Recall Preparedness	Maintains readiness in the event of a recall of food products.
Sanitation	Outlines procedures for effective cleaning and sanitation.
Pest Control	Control of pests and related hazards.
Maintenance	Control of hazards which might arise from improperly maintained equipment or during maintenance activities themselves.
Hygiene Training	Provides employees with basic knowledge of procedures and policies required to ensure that hygiene requirements are met.
Premises	Ensures that facilities are adequate for food production activities.

Typically, each prerequisite program includes a written program which outlines the policies and procedures to be followed as well as methods for employee training and record keeping. Sample logs and other supporting records are developed as required to document that required actions are taken.

HACCP Plans

HACCP plans are built upon the foundation provided by the prerequisite programs and focus primarily on controlling significant hazards which are likely to arise during specific production processes. Together the prerequisite programs and HACCP plans form the structure of a typical HACCP based system for a retail meat operation as shown below.

HACCP Based Food Safety System for a Full Service Retail Meat Operation



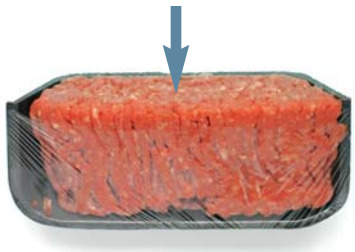
The process of developing a HACCP plan has 6 steps which are outlined below. Keep in mind that these same steps can be used for ground meat products as well as any other food production process.

1. **Assemble a HACCP Team** – A team of individuals should be created to build the HACCP plan.
2. **Describe the Process** – Completely describe the ground meat product and the steps to produce it. This will include developing a flow diagram which describes manufacturing steps as well as the product movement within the operation.
3. **Perform a Hazard Analysis** – Perform a hazard analysis and determine whether hazards should be controlled by the prerequisite programs, standard operating procedures or by what is known as a Critical Control Point (CCP). CCPs control significant hazards which can be prevented, eliminated or reduced to acceptable levels through actions which are under the control of the operator.
4. **Develop the HACCP Written Plan** – Determine critical limits for each CCP and describe monitoring, deviation, and verification procedures to ensure that food safety standards are met. Critical limits are criteria which separate acceptability from unacceptability.[1] Deviation procedures are pre-determined corrective actions taken both to address the cause of the failure and to control any potential food safety hazard which occurred while critical limits were not met. Verification activities are methods, procedures and tests that are used to determine if the HACCP plan for that establishment is valid and is operating properly.[1]
5. **Create HACCP Records** – Construct records which document that CCPs are monitored and, when required, corrective action is taken to address any deviation.
6. **Provide Training** – Develop a training program to ensure that the HACCP plan is understood by all personnel.

1 Quoted from the Food and Safety Enhancement Program (FSEP) Manual produced by the Canadian Food Inspection Agency.

Managing Meat Quality

Although what constitutes a quality ground meat product may differ depending on its intended use and the opinion of the purchaser, there is generally agreement on at least four factors which impact meat quality. These factors are appearance, palatability, shelf-life and nutrient composition. In this section of the manual we will address each of these individually.



Deoxymyglobin

Oxymyglobin

Metmyglobin

Appearance

The appearance of fresh ground meat is determined primarily by the amount and form of an oxygen carrying molecule in the muscle called myoglobin. Myoglobin in meat is most commonly found in three different states as illustrated at left for ground beef.

Deoxymyglobin is the form of myglobin which exists when fresh ground meat is placed inside a vacuum package or inside the centre of a retail package. It is generally described as having a purple-red appearance.

When ground meat is exposed to oxygen, the deoxmyglobin changes to *oxymyglobin* which simply means myglobin with oxygen. This pigment gives beef its bright, cherry red appearance which consumers associate with freshness.

Too long an exposure to oxygen and the action of bacteria can result in a further change where oxymyglobin become *metmyglobin*. This form of myglobin gives ground meat a brown appearance which is generally regarded as an indication of product which has exceeded its useable shelf-life.

In addition to the state of the myglobin, the appearance of ground meat is also influenced by the amount of the pigment in the muscles used and their pH (acidity of the muscle). Generally, the concentration of myglobin is higher in older or male animals, in muscles used for movement, and in beef versus pork. Muscles with low acidity will appear dark coloured and, at times, almost black (dark cutters) while muscles that are high in acidity will appear pale.

The colour and amount of fat in ground meat will also affect appearance. Grinds with higher fat content will naturally appear whiter. Also, if cattle that have been grass fed are utilized for ground meat production, plant pigments called carotenoids may give the fat a yellowish tinge.

Normally, when fresh ground meat is cooked, the myglobin becomes damaged or denatured forming a grayish brown coloured pigment. However, when the product includes a curing agent the myglobin combines with nitrogen compounds to form *nitrosomyoglobin* which gives it a characteristic bright pink-red colour. It is important to note colour changes in myglobin and the resulting appearance of meat is not a reliable indicator of doneness as many factors besides temperature influence appearance. Only a meat thermometer can be utilized to safely determine doneness level.

Palatability of Ground Meat

In ground meat the major factors influencing eating quality include the particle size, grinder operation, fat content, muscle composition, and preparation method. While they will not be discussed here many products include non-meat ingredients and seasoning which also have a major role in determining flavour and other aspects of palatability.

Particle Size

While in whole muscle cuts tenderness can be limited by both the structure and amount of connective tissue in the meat and the length of components of the muscle which allow it to contract called "sarcomeres", in ground meat these elements are at least partially disrupted by grinding into particles. Achieving the correct particle size for the product is very important in meeting eating quality expectations. Too small or too large particles will negatively impact texture. The table below outlines the grinding plate hole size recommended for some common ground meat products. A range of particle sizes may be utilized in products such as hamburger. It is important to determine consumer preferences in your market.

Grind Type	Plate Hole Size		Product Usage
Fine	1/8"	3.0 mm	Finely Ground Hamburger
Medium Fine	9/64"	3.5 mm	Medium Fine Hamburger, Jerky
Medium	5/32"	4.0 mm	Medium Hamburger, Breakfast Sausage
Medium Coarse	3/16"	4.8 mm	Coarse Hamburger, Regular Sausages
Coarse	1/4"	6.5 mm	Coarse Sausages, Coarse Bratwurst
Very Coarse	3/8"	9.5 mm	Pre - Grind, Chile, Chorizo, Linguisa
Pregrind Coarse	1/2"	12.5 mm	Very Coarse Pre - Grind, Chile Meat

Sourced from www.cmcchef.com/GrinderSpecs.htm

Grinder Operation and Ground Meat Texture

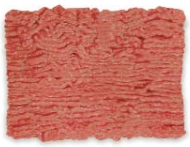
To avoid producing ground meat which would be described as mushy it is important to ensure the grinder is assembled correctly. In particular, make certain that the thrust washer is not missing from the feed screw, the ring is tight and the cutting edge of the knife correctly oriented (facing out toward the plate). It is also very important that the plate and knife be sharp enough to effectively operate. Lastly, ensure that the meat is not over 4°C when ground. If possible, lower temperatures of between 0°C and 2°C will have additional benefits for shelf-life as well as food safety.

Fat Content

While fat is regarded as an ingredient to be utilized in moderation, it does make a very significant contribution to flavour in ground meat products. Flavour is produced primarily through our ability to detect aromas or smells from substances called "aromatics" which are released when meat is chewed. Fat contains the majority of these substances and accordingly very lean grinds are not as flavourful and may be characterized as lacking juiciness and tenderness. Sensory testing has suggested that on the basis of taste *alone* consumers generally prefer a fat content of at least 20%.

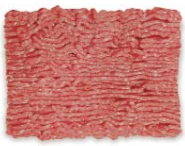
The required amount of fat for ensuring eating quality does depend on the desired usage, for example consumers wishing to purchase ground beef for use in a sauce can utilize a leaner grind than product which is to be consumed dry. The maximum fat content for extra lean, lean, medium and regular ground beef is shown below. These percentages are achieved by blending boneless trimmings with different lean content.

Extra Lean



- Maximum fat content 10%

Lean

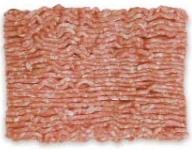


- Maximum fat content 17%

Medium

- Maximum fat content 23%

Regular



- Maximum fat content 30%

Boneless Trimmings 95% Lean

Boneless Trimmings 90% Lean

Boneless Trimmings 85% Lean

Boneless Trimmings 65% Lean

Boneless Trimmings 60% Lean

Boneless Trimmings 50% Lean

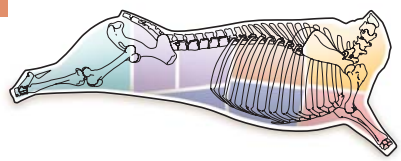
Muscle Composition

The type of muscle tissue incorporated into ground meat can influence palatability. As an example, many butchers advocate the use of ground beef produced from chuck for hamburger production. The preference expressed by some consumers for ground beef of defined muscle composition is reflected in the growth of the "source grind" category. Ground beef source grinds are most commonly produced from the round, chuck and sirloin portions of the carcass as shown below (for more information see page 24).

Boneless Round Trimmings

Boneless Sirloin Trimmings

Boneless Rib Trimmings



Ground Meat Preparation

As with whole muscle cuts, doneness level is critical to ensuring eating quality. While the meat thermometer is often recognized for its contribution to food safety, it also makes certain that ground meat and poultry products are not overcooked. As noted previously, the use of meat colour or appearance of juices is not a reliable way to determine doneness level. As an illustration if hamburger is made from beef with low levels of acidity (such as dark cutters), meat from bulls, or even with a reduced fat content, the product may appear red in the centre although it is fully cooked.

Ground Meat Shelf-Life

The shelf-life of ground meats and poultry from a meat quality perspective is primarily defined by the length of time which the product can maintain acceptable appearance and palatability attributes. Both of these elements are strongly impacted by the growth of microorganisms, which in ground meats are distributed throughout the product. Accordingly, maximizing the time available for display and subsequent use by the consumer requires action be taken to limit bacterial growth.

Controlling Spoilage Bacteria

As spoilage bacteria accumulate within fresh ground meat products, they promote formation of the brown pigments associated with expired product. The loss of the bright cherry red colour is especially a concern for ground beef display as any discolouration is more noticeable than with paler coloured products. The growth of these organisms can also result in the formation of compounds which cause off-odours, flavour changes and greening of tissue. To maximize shelf-life it is necessary to give careful consideration to interventions which can reduce their numbers especially sanitation and temperature control. In some circumstances, such as for case-ready product, modified atmosphere packaging may also be valuable.

Sanitation

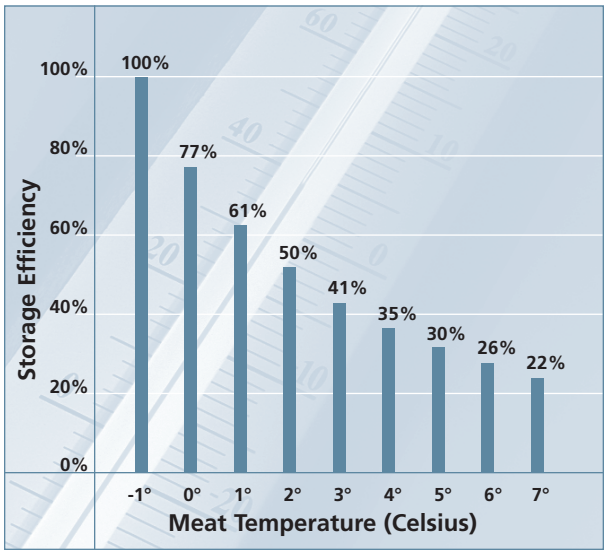
Unlike most bacteria which are related to illness from consumption of ground meat products, spoilage bacteria are able to grow at refrigeration temperatures. This ability to tolerate cold environments can result in their accumulation on equipment and other food contact surfaces. An effective sanitation program can limit this accumulation and reduce the number transferred to food products. The direct result of this effort will be an increase in shelf-life.

On a periodic basis, it is recommended that microbial (total aerobic count) testing be performed on product immediately after grinding to determine the initial level of bacteria present. While this inexpensive test is not a perfect indicator of the level of spoilage organisms present, it can be helpful. Total aerobic counts alone do not provide reliable information in relation to food safety and should not be used for this purpose.

Temperature Control

Even with the most effective sanitation programs, some spoilage organisms will be present in ground meat products. Maintaining colder temperatures limits their growth and helps delay the reduction in quality attributes which they produce. To describe the relationship between temperature and the growth of bacteria causing spoilage, a term called "shelf-life efficiency" is used. The maximum value is achieved at -1°C which is the coldest fresh meat should be stored (meat begins to freeze at -1.5°C). Using the graph below you can determine the shelf-life efficiency for storage and display conditions in your operation. At 6°C shelf-life efficiency is 26% which means that growth of spoilage organisms is approximately double that at 2°C where the shelf-life efficiency is 50%. To maximize ground meat shelf-life always store it at 4°C or lower and if possible between 2°C and 0°C.

Storage Efficiency vs Temperature



Modified Atmosphere Packaging

It has been recognized for years that vacuum packaging combined with an oxygen impermeable film could significantly enhance shelf-life of ground meat. Unfortunately, consumers have been reluctant to accept this type of packaging as without oxygen, products like ground beef do not achieve the characteristic cherry red colour. As a result, ground meat has been placed in packages wrapped with oxygen permeable film to promote colour development. While appearance is maintained in the short term, this type of packaging does not inhibit the growth of microorganisms.

Some manufacturers like those producing case-ready products are using what is called "modified atmosphere packaging." In this circumstance an impermeable film is utilized to retain a mixture of gases which extend shelf-life through inhibition of bacterial growth. Generally, the so called "high oxygen" gas mixtures are used for less demanding applications where a smaller shelf-life extension is obtained while still permitting meat to bloom. Some issues with lipid oxidation and rancid flavour development have been noted with high oxygen systems. Also available are "low oxygen" mixtures which maximize shelf-life but contain products which may appear less attractive. A recent innovation in low oxygen case-ready technology has been the development of packaging with a peelable, impermeable film over top of an oxygen permeable layer. The impermeable film is kept on the package until 30 minutes before display when it is removed to allow meat to bloom.

Antioxidants

Antioxidants may also extend shelf-life, although not directly through reduction of bacterial growth. Rather, these compounds make the myglobin and lipids in meat more resistant to oxidation – a process which causes the production of off-flavours and loss of colour.

Antioxidants such as citric acid (vitamin C) or the spice, rosemary, can be added to ground meat products directly, provided labeling regulations are satisfied. Alternatively, antioxidants can be incorporated into the diet of livestock which can be of benefit in finished product as long as high enough levels are achieved. Currently, there is wide spread supplementary feeding of vitamin E to beef cattle because of its anti-oxidant effect.

Antioxidants may also be of value in preventing warmed-over flavour (WOF) which results from lipid oxidation in pre-cooked meat and poultry products. This action is especially valuable for ground meat items given their typically higher fat content which makes them more susceptible to WOF than whole muscle items.

Lighting and Meat Appearance

While light in the display case enables consumers to see the product, over time it also has a negative impact on meat appearance. This occurs both from the so-called "greenhouse effect" when heat generated by light is trapped underneath the overwrap and by the direct action of light on myglobin. Accordingly, to extend shelf-life and enhance meat appearance, efforts should be made to reduce light exposure when practical. This includes using lower wattage or specially designed bulbs, turning off lighting promptly when not required for display, and storing meat covered.

Nutritional Composition

The nutritional value of meat products is determined by the content of nutrients (vitamins, minerals, protein and fat) as well as energy. Like whole muscle product, ground beef has thirteen essential nutrients but at a typically lower price point. Ground beef products are naturally high in protein, contain significant amounts of minerals such iron, zinc, and vitamins including riboflavin, thiamine, niacin, vitamin B6 and B12. The table below provides information on some of the essential nutrients in beef.

Category	Nutrient	Function
Protein	Ground beef has all 20 amino acids needed to make a complete protein.	Protein performs many functions in the human body, including its key role in the growth and repair of muscle tissue.
Vitamins	Ground beef contains all five B-complex vitamins – thiamin, riboflavin, niacin, B6 and B12.	Thiamin, riboflavin, niacin and vitamin B6 assist the body to turn food into energy. They also help with growth and maintenance of healthy skin, eyes, appetite and central nervous system.
Minerals	Ground beef contains iron and zinc in forms which are more easily absorbed by the body than that available from plants.	Iron is essential to life and is required for functions which include the production of normal red blood cells. Zinc is essential for growth, a strong immune system and healthy pregnancies.

Researchers are examining the potential of different feeding regimes in cattle to enhance the nutrient content of beef. As an example, it may be possible to increase the amount of conjugated linoleic acid, a naturally occurring compound in beef which may have anti-cancer properties.

Nutrition Labelling for Ground Meats

Many Canadians are taking an increasing interest in the nutrient content of the foods they eat. As a result, Health Canada has passed legislation which requires a label with nutrition information on most foods sold at retail. This legislation will be mandatory on December 12, 2005. Small businesses (with gross revenues from sales of food in Canada of less than $1 million for the 12-month period immediately prior to December 12, 2002) have until December 12, 2007 to comply.

All ground beef and ground poultry will be required to have a Nutrition Facts table on the package as of December 12, 2005. The guidelines established by Health Canada are summarized on the next page.

Note: The text in this manual relating to Nutrition Labelling Regulations is provided for information purposes only. Readers should consult with the official documentation when making management decisions and to obtain the most current requirements. Nutrition Labelling regulations are available on Health Canada's website at www.hc-sc.gc.ca

Additional information is available from the Beef Information Centre at www.beefinfo.org/retail_nutritionlabelling.cfm

Products Requiring a Nutrition Facts Table

With the exception of ground beef that is packaged at the request of a consumer at a full-service meat counter, following the effective date, all ground meat and ground poultry packaged in a retail operation must have a Nutrition Facts table. Visit the 2003 Guide to Food Labelling and Advertising at www.inspection.gc.ca/english/fssa/labeti/guide/toce.shtml for the most current regulations.

Label Formats and Orientation

Retailers, who package in-store, can choose from a variety of label formats regardless of the size of the package or what is referred to as the "available display surface" or ADS. For ground meat and ground poultry packaged centrally by a processor, there are specific requirements for label formats based on the ADS.

The Nutrition Facts table must be displayed on one continuous surface. The table must be oriented in the same manner as other information on the package if there is sufficient space. If there is insufficient space, the table can be oriented so that it fits on the package, e.g., rotated 90°.

Label Language

At retail, the language chosen for the label will usually be the same as on the principal display panel. Bilingual labels are required in cities/towns that are designated as bilingual. In most cases for ground meat and poultry packaged centrally by a processor, the Nutrition Facts table must be presented in both English and French or bilingual.

Nutrition Label Values

The values for the Nutrition Facts table must be for the food as sold – generally as a raw product at retail. One hundred grams (100 g) is the usual serving size for ground beef.

The Beef Information Centre has prepared a variety of Nutrition Facts tables for the four categories of ground beef and source grinds produced from sirloin, round and chuck (see appendix I). The ultimate responsibility for ensuring that the format complies with the regulations and for the accuracy of the nutrition values is: 1) the retailer if packaged in store, and 2) the processor if centrally packaged.

Lean Ground Beef
Standard Format 1.1

The information is based on a specific amount of food.

The % Daily Value indicates whether there is a lot or a little of a nutrient in the specific amount of food compared to a Daily Value.

Nutrition Facts

Per 100 g

Amount	% Daily Value
Calories 210	
Fat 15 g	**22** %
Saturated 6 g + Trans 0.5 g	**34** %
Cholesterol 60 mg	
Sodium 65 mg	**3** %
Carbohydrate 0 g	**0** %
Fibre 0 g	**0** %
Sugars 0 g	
Protein 20 g	

Vitamin A	0 %	Vitamin C	0 %
Calcium	0 %	Iron	15 %

The table must include Calories and these 13 key nutrients. More nutrients may be included on some labels.

This number is the actual amount of the nutrient in the specific amount of the food, which is rounded according to the rules in the Regulations.

NOTE: Although the Canadian Nutrition Facts table is similar to the US label, US labels cannot be used due to differences in label content and design.

Profitability of Ground Meat

The financial importance of ground meat to the retail meat operation is significant. For the beef category ground product sales comprise about 50% of total volume and approximately 30% of revenues. Additionally, the management of the ground meat category is often used as an indication of the overall quality of the operation by consumers and by senior management.

In this section of the manual three key factors influencing the sales and profitability of ground meat at retail will be discussed. These aspects of ground beef category management are:

Ingredient Purchasing – factors to consider when purchasing ingredients for ground meat production.

Production Planning – monitoring and analyzing production volumes and efficiency.

Merchandising – trends in merchandising ground meats including case-ready products, source grinds, branded programs and certified organic products.

Financial Analysis

For decision making relating to these elements, the ability to conduct and understand financial analysis is very important. Information on this topic is available from the Financial Tools program developed by the Beef Information Centre (BIC). The *Financial Manual for Meat Professionals* (Retail Edition) is a resource produced by BIC to explain financial terminology and its application to the meat industry.

Also available are the Financial Tools electronic applications which are Microsoft Excel™ based spreadsheets. The software can be used for financial analysis related to ground meat as well as for many other aspects of the management of a retail meat operation. A guide is available in printed and electronic formats to assist the user with the operation of the Financial Tools applications.

Species	▶Meat Block (MB)	▶Specification		▶Grade	# Pieces	▶Weight	▶Supplier
Beef	Sirloin Tube Grinds	91% Lean				100.00	

#	UPC	▶Retail Description	kg	$/kg	Revenue	Yld %	Value %	$/100kg MB
1	432	Extra Lean Ground Sirloin	99.00	$9.90	$980.10	99.00%	100.00%	$980.10
2								
3								
4								
5								
6								
7								
SUB-TOTALS (Useable Yield)			99.00	$9.90	$980.10	99.00%	100.00%	$980.10
1	999	Fat		$0.00	$0.00	0.00%	0.00%	$0.00
2	998	Bone		$0.00	$0.00	0.00%	0.00%	$0.00
Enter Initial Purge+Cutting Loss ▶			1.00	$0.00	$0.00	1.00%	0.00%	$0.00
TOTALS			100.00	$9.80	$980.10	100.00%	100%	$980.10

www

Variable Costs (CAN $)	Test	$/100kg MB	$/kg
Meat Cost ▶	$613.00	$613.00	$6.13
Cutting Labour ▶	$1.25	$1.25	$0.01
Production Labour ▶	$0.00		
Packaging Labour ▶	$0.83	$0.83	$0.01
Packaging Cost ▶	$14.00	$14.00	$0.14
Other Costs ▶	$0.00		
TOTALS	$629.08	$629.08	$6.29

▶Enter Report Information
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▶View Financial Margins
▶Analysis Tools Menu
▶Print Report | ▶Forms
▶Select Units (US and CAN)
▶New Users Click Here
▶Zoom | ▶Main | ▶Help

Purchasing Ground Meat Ingredients

Ingredient procurement is a major factor impacting the profitability of the ground meat category. Raw materials generally come from shop trim including rework and/or purchased trim and coarse grinds.

Trim Cost Analysis

A consideration for many operations is whether to purchase meat for cut production with a specification which would generate additional trim for ground meat/stir fry production or to source closely trimmed sub-primals and purchase ingredients for grinding separately. To make this decision, a trim cost analysis which considers each operations unique circumstances and current market prices must be undertaken.

As a first step, the difference in the quantity of trim obtained from both specifications is determined. In the example below, for every 10 kg of meat block with the commodity specification an extra 0.9 kg of lean trim would be generated relative to the 1/8 inch trim product.

Trim Weights

Meat Block Specification	Meat Block Cost/kg	Meat Block Weight	Trim Obtained	Trim Market Value[1]	Meat Cuts Produced
Commodity trim	$10.00/kg	10.0 kg	1.0 kg Lean Trim	$3.28/kg	9.0 kg
1/8 inch trim	$10.50/kg	10.0 kg	0.1 kg Lean Trim	$3.28/kg	9.9 kg

Once the difference in trim is obtained, the cost of meat sold for cut production is calculated. As outlined, the market value of the trim generated is credited before the meat cost per kg is determined. In our example the use of the leaner specification is the better value as it reduces the cost of meat by $0.17/kg ($10.75 – $10.58 = $0.17/kg). Accordingly, it would be more profitable to purchase lean trim from an external supplier and utilize the meat block with 1/8 inch trim.

Trim Cost Analysis

Meat Block Specification	Total Meat Block Cost	Trim Credit	Meat Cost with Trim Credit	Meat Cuts Produced	Meat Cost/kg Cuts Produced
Commodity trim	(10 kg x $10/kg) = **$100**	(1.0 kg x $3.28/kg) = **$3.28**	($100 – $3.28) = **$96.72**	9.0 kg	($96.72 / 9.0 kg) = **$10.75/kg**
1/8 inch trim	(10 kg x $10.50/kg) = **$105**	(0.1 kg x $3.28/kg) = **$0.33**	($105 – $0.33) = **$104.77**	9.9 kg	($104.77 / 9.9 kg) = **$10.58/kg**

The illustration provided is simplified given that often more than one type of trim would be generated from the meat block. In this situation, the trim credit is calculated by multiplying the market value by the amount for each type of trim and then totaling it to obtain the trim credit value. As an example, if we obtained both regular and lean trim from the meat block with the commodity specification and the market value of regular trim was $1.70/kg, the trim credit would be $2.49 as shown below.

Trim Credit = [(0.5 kg regular trim x $1.70/kg) + (0.5 kg lean trim x $3.28/kg)] = $2.49

1. *Market value in this type of analysis is the purchase price of trim which would otherwise have to be purchased from an external supplier had it not been produced internally. Shop trim which could not be utilized by an operation (thrown away) should be assigned a market value of zero. Keep in mind market value of trim purchased from an external supplier includes labour and packaging costs. To the extent there are additional costs exclusively associated with shop trim production, these should be subtracted from the trim credit in all calculations.*

Least Cost Ingredient Formulation

In most cases, several different combinations of meat ingredients could be utilized to achieve the same lean/fat percentage in a ground product. All other aspects being equivalent, the ingredient proportions will be decided on the basis of cost. To determine the least cost formulation in complex situations, such as where more than two ingredients are being considered, use of computer software is required. In simple situations, a method called Pearsons Square can be used as in the example below.

Assume you wish to produce 100 kg lean ground beef product with a final fat content of 17%. Ingredients available and cost are as shown at right. The objective is to determine if it would be more profitable to use bull meat OR boneless chuck to blend with the 50% lean trimmings.

If we utilize the formulas provided below, we note that although bull meat is more expensive per kg, its use results in the most cost effective blend $2.07/kg versus $2.12/kg when boneless chuck is used.

Ingredient	Fat %	Price/kg
Bull Meat	8%	$2.30/kg
50% Lean Trimmings	50%	$1.20/kg
Boneless Chuck	14%	$2.20/kg

Pearson Square Formula	50% Lean Trimmings and Bull	50% Lean Trimmings and Chuck
Value A = Ingredient 1 Fat %	50%	50%
Value B = Ingredient 2 Fat %	8%	14%
Value C = Desired Fat Content %	17%	17%
Value D = B – C*	9%	3%
Value E = A – C*	33%	33%
Value F = D + E	42%	36%
Ingredient Proportions		
Proportion Ingredient 1 = D/F	9/42 = **0.2142**	3/36 = **0.0833**
Proportion Ingredient 2 = E/F	33/42 = **0.7857**	33/36 = **0.9166**
Ingredient Weights		
Kg Required Ingredient 1	(**0.2142** x 100 kg) = 21.42kg	(**0.0833** x 100 kg) = 8.33kg
Kg Required Ingredient 2	(**0.7857** x 100 kg) = 78.57 kg	(**0.9166** x 100 kg) = 91.66 kg
Total Kg	100 kg	100 kg
Ingredient Costs		
Cost Ingredient 1/kg	(**0.2142** x $1.20/kg) = $0.26	(**0.0833** x $1.20/kg) = $0.10
Cost Ingredient 2/kg	(**0.7857** x $2.30/kg) = $1.81	(**0.9166** x $2.20/kg) = $2.02
Cost per Kg Mixture	($0.26 + $1.81) = **$2.07/kg**	($0.10 + $2.02) = **$2.12/kg**

* *Ignore negative values.*

Purchasing Specifications

When purchasing ingredients for ground meat production, it is important to understand the requirements which need to be specified. The page below outlines purchasing specifications for the most common ingredients utilized in ground beef products.

Boneless Trimmings

Points Requiring Specification:

- Visual lean (VL) or chemical lean (CL) lean point determination
- Primal cuts and/or associated pieces to be included
- Inclusion of flank or brisket meats
- Inclusion of fore/hind shank meats
- Inclusion of diaphragm or intercostals meats
- Minimum/maximum piece size requirements
- Meat block type, origin and composition; OTM (beef derived from cattle over thirty months of age), UTM (beef derived from cattle under thirty months of age), bull meat or offshore/import content.

Boneless Trimmings 95% Lean

Boneless Trimmings 90% Lean

Boneless Trimmings 85% Lean

Boneless Trimmings 65% Lean

Boneless Trimmings 60% Lean

Boneless Trimmings 50% Lean

Boneless Round Trimmings

Prepared from hip primal cuts and/or associated trimming pieces

Hip Group Includes: *Inside Round, Outside Round, Eye of Round, Sirloin Tip and Heel of Round*

Points Requiring Specification:

- Lean point requirement
- Visual lean (VL) or chemical lean (CL) lean point determination
- Primal cuts to be included
- Minimum/maximum piece size requirements

Boneless Sirloin Trimmings

Prepared from sirloin primal cuts and/or associated trimming pieces

Sirloin Group Includes: *Top Sirloin Butt, Bottom Sirloin Tri-tip, Bottom Sirloin Ball Tip and Bottom Sirloin Flap*

Points Requiring Specification:

- Lean point requirement
- Visual lean (VL) or chemical lean (CL) lean point determination
- Primal cuts to be included
- Minimum/maximum piece size requirements

Boneless Rib Trimmings

Prepared from rib primal cuts and/or associated trimming pieces

Rib Group Includes: *Rib, Blade Meat, Rib Finger Meat (intercostals) and Short Rib*

Points Requiring Specification:

- Lean point requirement
- Visual lean (VL) or chemical lean (CL) lean point determination
- Primal cuts to be included
- Inclusion of cutaneous trunci, diaphragm and/or serous membrane (peritoneum)
- Minimum/maximum piece size requirements

Boneless Chuck Trimmings

Prepared from chuck primal cuts and/or associated trimming pieces

Chuck Group Includes: *Blade, Clod, Neck, Shoulder, Chuck Ribs*

Points Requiring Specification:

- Lean point requirement
- Visual lean (VL) or chemical lean (CL) lean point determination
- Primal cuts to be included
- Inclusion of cutaneous trunci, diaphragm and/or serous membrane (peritoneum)
- Minimum/maximum piece size requirements

Boneless Shank Trimmings

Prepared from shin shank and/or associated trimming pieces

Shank Group Includes: *Front Shank, Hind Shank, Heel Muscle (gastrocnemius), Conical Muscle (biceps brachii) and associated muscles from the humerus*

Points Requiring Specification:

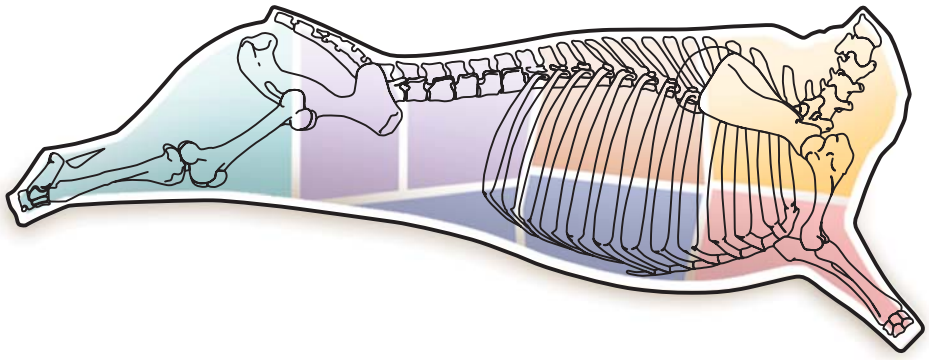
- Lean point requirement
- Visual lean (VL) or chemical lean (CL) lean point determination
- Removal or retention of connective tissue and/or skin
- Removal or retention of sinews and/or tendons

Caul Fat

Originates from the fat lining of the abdomen.

Caul Fat Group Includes: *Heart Fat, Caul Fat and Kidney Fat*

Common Names: *Cod Fat, Kidney Fat*



Production Planning

The relatively short shelf-life of fresh ground meat requires that production be closely matched to demand or inventory will expire or be sold at discounted values. There are a significant number of factors which can affect sales including weekday, season, feature activity, ingredient prices, etc.

The best way to determine quantities required is to track production and sales which makes it possible to examine trends over time. A production log can be utilized like that shown below. Having too little inventory can result in lost sales which will mean the operation loses the value of the contribution margin for the units which could have been sold. Alternately, having too much inventory means there is a loss of revenue equal to the difference between the regular and marked down price. In the worst case scenario, a large excess in inventory makes it necessary to dispose of product, which means the complete production cost of that unit must be recovered from other sales.

A production efficiency analysis should also be conducted as shown below. Achieving greater production efficiency (reduced discounted and/or expired product) is made easier by maximizing shelf-life through good manufacturing practices, temperature control or specialized packaging. If necessary, consideration should be given to the creation of a frozen pattie program using ground product that it is about to expire (but has not yet). Expired product should not be utilized in the next days fresh ground meat production.

Ground Beef Production Log

Date May 24 Type Lean

Time	Starting Inventory	Amount Produced	Total Available	Ending Inventory	Sales for Period	Average Sales/Hr
7 - 12 PM	50 kg	120 kg	170 kg	35 kg	135 kg	27.0 kg
12 - 5 PM	35 kg	120 kg	155 kg	25 kg	130 kg	26.0 kg
5 - 9 PM	25 kg	40 kg	65 kg	30 kg	35 kg	8.8 kg
Day Total	50 kg	300 kg	350 kg	30 kg	320 kg	22.9 kg

Production Efficiency Analysis

Product Sold Discounted	15 kg	4.7%	**Comments** 20 kg of product had to be discounted because of discoloration. Sold 15 kg but 5 kg expired and was lost as shrink
Expired Product	5 kg	1.6%	
Product Sold at Regular Price	300 kg	93.8%	
Product In Stock	Morning ☑ Afternoon ☑ Evening ☑		
Day Total	320 kg	100 %	

Merchandising

Merchandising Trends

Merchandising in the ground meat category is strongly influenced by factors such as growing awareness of diet and its contribution to health. Consumers are continuing to choose leaner products more often, likely due to increasing awareness of fat intake and an aging population. For the ground beef category this has reduced sales of regular and medium grinds while increasing the sales of lean and extra lean items. It also creates both the need and opportunity to better communicate the health benefits of leaner products and nutrient content (see page 26). The demand for products perceived to offer health benefits may also be responsible for the emergence of a small but growing certified organic category (see page 23).

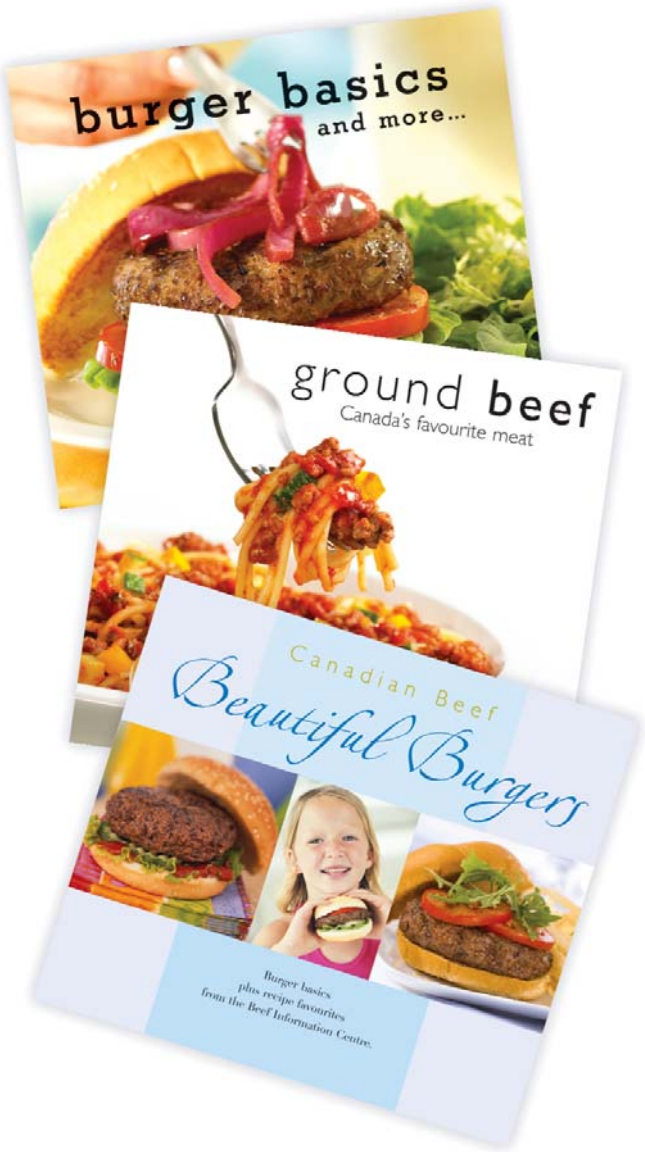
Food safety related issues have also created changes in how ground meat is merchandised. As an example, enhanced traceability and associated recalls combined with a changing legal environment have contributed significantly to the sales of case-ready ground meat products (see page 25). Traditional economic forces continue to play a role and the ongoing challenge of differentiating products in an increasingly competitive market place has fueled the growth of branded programs.

Display Case Management

The importance of a well stocked and properly maintained display case to merchandising efforts can not be overstated. Display cases should have adequate but not excessive lighting and be monitored to ensure adequate temperature control to maximize product shelf-life. In addition, it is useful to consider the placement of ground meat in the display case and its potential contribution to overall meat sales. Given the recognized importance of fresh grinds/patties to the meat department it is advisable to place them at the end of the aisle in the general direction of traffic flow. Other popular items such as steaks can be placed at the entry to the department with the highest margin items in-between. While a single planogram cannot be recommended for all situations and seasons, it is valuable to clearly define the meat case to facilitate purchases by consumers as well as the identification of out of stock items by employees.

Consumer Communication

Ultimately, the foundation of all merchandising efforts is communication with consumers. Traditionally, flyers and point of sale material have been the primary method to reach potential purchasers. Most recently, labelling has received renewed attention in the ground meat category as a result of regulatory actions. Mandatory nutritional labelling for ground meats ensure consumers understand product nutrient content (see page 16). Legislation is also being considered for mandatory labeling of ground meat products with safe handling and cooking instructions.



Branded Ground Meats

Research performed by the Beef Information Centre has indicated that approximately 40% of Canadian consumers state their confidence in a beef product would be increased if it were branded. Branding provides meat products with a unique identity which can provide opportunity for differentiation and higher margins. Research has also shown that consumer expectations are higher with branded products so it is important to clearly communicate the attributes which define the brand. Most commonly branded ground meat programs are associated with specification based attributes such as case-ready packaging, natural or certified organic production systems and meat produced from specific breeds or defined portions of the carcass. There are generally five types of brands which are outlined below:

Producer Brands – brand defined by production systems and/or point of origin of the animals.

Processor Brands – a brand created by the processor.

Retailer Brands – a brand created by the retailer of the product.

Co-Brand – typically a brand created jointly by the retailer/processor.

Breed Specific – the brand is based on defined genetics typically certified by an independent body.

Certified Organic Beef Products

In general, demand for organic foods has increased and it is likely that this trend will also be reflected in the meat category. While there is considerable scientific debate as to whether the safety or quality of organic products are indeed superior to conventionally produced items, it is clear that some consumers wish to purchase them.

Certified organic beef is produced with the participation of a certifying body which conducts audits of the livestock facility. There are more than 40 certifying bodies in Canada who confirm that the requirements of Canada's voluntary *National Standard for Organic Agriculture* are satisfied. It is important to note that certification of products

described as organic is not mandatory in all provinces. It can require three or more years for a producer to become certified for organic beef production.

Organic Claims[1]

According to the national standard, a food product may be labelled "organic" if it consists of at least 95% organic ingredients. When the food product contains a minimum of 70% organic ingredients a claim may be made, provided the percentage of organic ingredient(s) present in the food is made on the principal display panel. When a food product contains less than 70% organic ingredients, claims with respect to the organic content of the foods may only be made within the list of ingredients.

Natural Beef Products

The term "natural" is not interchangeable with the term "organic." Further, there is not a national standard for natural products and the requirements are defined by the producer. Typically natural beef production does not permit antibiotic use for growth enhancement or the use of hormone implants.

1. Adapted from section 4.8 of the Canadian Food Inspection Agency Guide to Food Labelling and Advertising – available on the internet at http://www.inspection.gc.ca/english/fssa/labeti/guide/ch4ae.shtml#4.8

Source Grinds

Traditionally, the ground beef category has been driven by pricing with few opportunities for product differentiation. The incorporation of premium ground beef products (such as source grinds) into the meat counter provides an opportunity to move away from the commodity-oriented approach.

In recent years, source grinds or ground beef made from specific portions of the carcass have increased their market share significantly. This product category has become popular for a variety of reasons. Firstly, by the use of defined portions of the carcass such as the round, sirloin or chuck there is potential to create a product with distinct characteristics. This is not possible during the production of traditional ground beef where most commonly trim from the whole carcass is blended together. In addition, research indicates a consumer preference for ground meat products with more clearly defined ingredients. It is anticipated that demand for these products will continue to grow.

Extra Lean Ground Beef – Round

Extra Lean Ground Beef – Sirloin

Lean Ground Beef – Chuck

A Financial Perspective

Most processors now offer certified source specific grinds and, where practical, retailers may also utilize their own source specific trim produced at store level. An analysis can be performed to determine the potential contribution margin of source grinds and other ground meat items using the BIC Yield Test spreadsheet as shown below.

Species	▶Meat Block (MB)	▶Specification		▶Grade	# Pieces	▶Weight	▶Supplier
Beef	Sirloin Tube Grinds	91% Lean				100.00	
#	UPC ▶Retail Description	kg	$/kg	Revenue	Yld %	Value %	$/100kg MB
1	432 Extra Lean Ground Sirloin	99.00	$9.90	$980.10	99.00%	100.00%	$980.10
2							
3							
4							
5							
6							
7							
SUB-TOTALS (Useable Yield)		99.00	$9.90	$980.10	99.00%	100.00%	$980.10
1	999 Fat		$0.00	$0.00	0.00%	0.00%	$0.00
2	998 Bone		$0.00	$0.00	0.00%	0.00%	$0.00
Enter Initial Purge+Cutting Loss▶		1.00	$0.00	$0.00	1.00%	0.00%	$0.00
TOTALS		100.00	$9.80	$980.10	100.00%	100%	$980.10

Variable Costs (CAN $)	Test	$/100kg MB	$/kg
Meat Cost ▶	$613.00	$613.00	$6.13
Cutting Labour ▶	$1.25	$1.25	$0.01
Production Labour ▶	$0.00		
Packaging Labour ▶	$0.83	$0.83	$0.01
Packaging Cost ▶	$14.00	$14.00	$0.14
Other Costs ▶	$0.00		
TOTALS	$629.08	$629.08	$6.29

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▶Print Report ▶Forms
▶Select Units (US and CAN)
▶New Users Click Here
▶Zoom ▶Main ▶Help

In this example extra lean ground sirlon is generated from a tube grind. All amounts are shown for 100 kg meatblock (MB)

Revenue	**$980.10**
Variable Costs	
Meat	$613.00
Labour ($1.25 + $0.83)	$2.08
Packaging	$14.00
Total	**$629.08**

Margins per 100 kg MB

Meat Margin =
$980.10 – $613.00 = **$367.10**

Contribution Margin
$980.10 – $629.08 = **$351.02**

Case Ready Ground Meat Products

Case ready products can have significant benefits for shelf-life (see page 13), however, there has been some reluctance at the consumer level to accept this technology because of the perception that case-ready products may not be as "fresh." Customers also value the availability of the expertise associated with the presence of meat department staff which would be reduced if case-ready merchandising were adopted for cuts *in addition* to ground meats. Beyond shelf-life, there are other benefits which consumers do recognize which include packaging that does not leak and the ability to freeze product without rewrapping.

Advantages for the Retailer

From a retailer perspective there are a significant number of advantages associated with case-ready ground meat which are summarized below.

- A reduced requirement for skilled labour which is often difficult to obtain.
- The opportunity to accommodate a broader range of ground meat products and address niche markets without a requirement for large batches produced in store.
- Potentially enhanced food safety due to the availability of dedicated quality assurance personnel and specialized food safety systems in larger processing establishments.
- The ability to restock shelves without restarting the grinder including after hours periods or holidays.
- Decreased liability for the retailer and a potentially enhanced ability to track product if required.
- Reduced cost associated with sanitation of grinder and need for complete cleanup between species.
- Potentially enhanced meat appearance with case-ready packaging which combines a modified atmosphere package (to extend shelf-life) with a peelable top film which permits blooming.
- Better ability to ensure precise fat/lean content to comply with new nutrition labeling requirements.
- Reduced cost of shrink from expired or discounted ground meat products as a result of enhanced shelf-life and/or better inventory control, likely the most significant advantage to the retailer.

Considerations Relating to Case-Ready Products

While case-ready technology is continually improving, there are still some trade-offs to consider beyond their cost. For example, high oxygen systems which permit blooming in the package may have issues with increased lipid oxidation and formation of off-flavours. Conventional low oxygen systems offer extended shelf-life, but appearance of products is affected. Packaging which utilizes an impermeable film which can be removed approximately 30 minutes before display permits timely colour development, but requires that labels be applied by the retailer.

Ultimately, the decision to utilize/not utilize case-ready ground meat can only be made after a cost and benefit analysis is performed by each individual operation. This must consider the availability of a reliable source of case-ready product, the market demographic, labour supply as well as a detailed review of financial implications.

Appendix I: **Nutritional Labelling**

Ground Beef

Regular Ground Beef

Nutrition Facts	
Per 100 g	
Amount	**% Daily Value**
Calories 300	
Fat 25 g	**38** %
Saturated 10 g + Trans 0.5 g	**55** %
Cholesterol 65 mg	
Sodium 60 mg	**3** %
Carbohydrate 0 g	**0** %
Fibre 0 g	**0** %
Sugars 0 g	
Protein 17 g	
Vitamin A 0 %	Vitamin C 0 %
Calcium 0 %	Iron 15 %

Medium Ground Beef

Nutrition Facts	
Per 100 g	
Amount	**% Daily Value**
Calories 250	
Fat 19 g	**29** %
Saturated 7 g + Trans 1 g	**37** %
Cholesterol 60 mg	
Sodium 60 mg	**2** %
Carbohydrate 0 g	**0** %
Fibre 0 g	**0** %
Sugars 0 g	
Protein 19 g	
Vitamin A 0 %	Vitamin C 0 %
Calcium 0 %	Iron 10 %

Lean Ground Beef

Nutrition Facts	
Per 100 g	
Amount	**% Daily Value**
Calories 210	
Fat 15 g	**22** %
Saturated 6 g + Trans 0.5 g	**34** %
Cholesterol 60 mg	
Sodium 65 mg	**3** %
Carbohydrate 0 g	**0** %
Fibre 0 g	**0** %
Sugars 0 g	
Protein 20 g	
Vitamin A 0 %	Vitamin C 0 %
Calcium 0 %	Iron 15 %

Extra Lean Ground Beef

Nutrition Facts	
Per 100 g	
Amount	**% Daily Value**
Calories 180	
Fat 10 g	**15** %
Saturated 4 g + Trans 0.3 g	**20** %
Cholesterol 55 mg	
Sodium 65 mg	**3** %
Carbohydrate 0 g	**0** %
Fibre 0 g	**0** %
Sugars 0 g	
Protein 21 g	
Vitamin A 0 %	Vitamin C 0 %
Calcium 0 %	Iron 15 %

Source Grinds

Lean Ground Chuck

Nutrition Facts	
Per 100 g	
Amount	**% Daily Value**
Calories 210	
Fat 15 g	**22** %
Saturated 6 g + Trans 0.5 g	**34** %
Cholesterol 60 mg	
Sodium 65 mg	**3** %
Carbohydrate 0 g	**0** %
Fibre 0 g	**0** %
Sugars 0 g	
Protein 20 g	
Vitamin A 0 %	Vitamin C 0 %
Calcium 0 %	Iron 15 %

Lean Ground Sirloin

Nutrition Facts	
Per 100 g	
Amount	**% Daily Value**
Calories 210	
Fat 15 g	**22** %
Saturated 6 g + Trans 0.5 g	**34** %
Cholesterol 60 mg	
Sodium 65 mg	**3** %
Carbohydrate 0 g	**0** %
Fibre 0 g	**0** %
Sugars 0 g	
Protein 20 g	
Vitamin A 0 %	Vitamin C 0 %
Calcium 0 %	Iron 15 %

Extra Lean Ground Round

Nutrition Facts	
Per 100 g	
Amount	**% Daily Value**
Calories 180	
Fat 10 g	**15** %
Saturated 4 g + Trans 0.3 g	**20** %
Cholesterol 55 mg	
Sodium 65 mg	**3** %
Carbohydrate 0 g	**0** %
Fibre 0 g	**0** %
Sugars 0 g	
Protein 21 g	
Vitamin A 0 %	Vitamin C 0 %
Calcium 0 %	Iron 15 %

Extra Lean Ground Sirloin

Nutrition Facts	
Per 100 g	
Amount	**% Daily Value**
Calories 180	
Fat 10 g	**15** %
Saturated 4 g + Trans 0.3 g	**20** %
Cholesterol 55 mg	
Sodium 65 mg	**3** %
Carbohydrate 0 g	**0** %
Fibre 0 g	**0** %
Sugars 0 g	
Protein 21 g	
Vitamin A 0 %	Vitamin C 0 %
Calcium 0 %	Iron 15 %

Important Notice

Printing Labels The sample labels shown on this page are for illustration purpose only and are not suitable for reproduction purposes.

Accuracy of Values Although the Beef Information Centre believes the values accurately describe the nutritional content of ground beef in Canada, we make no representation or warranty of any kind and disclaim all liability of any kind whatsoever arising out of your use of this information.

Export Use Although the Canadian Nutrition Facts table is similar to the US label, US labels cannot be used in Canada due to differences in label content and design.

Appendix II: Grinding Log

Grinding Log
Photocopy Template on page 30.

How to Use the Grinding Log

1 Grinding Time & Date

Record the time and date when in-store grinding was initiated for the batch.

2 Ingredient Source and Supplier

Internal

In this column simply place a check mark if the trim was generated in-store during fabrication of cuts or if rework from the display case was used to create ground meats. If trim or ground meats was purchased from external suppliers, leave blank.

Supplier

If coarse ground meats or trim is purchased from an external supplier, record the name of the supplier in the space indicated.

3 Species

Record the species ground using the first letter of its name. Use **P** for pork and **B** for Beef.

4 Ingredient Production Date

Rework

If rework is utilized, record the original "packaged on date" of the product which was reworked.

Internal Trim

Record the "produced on date" for the trim which was generated during in-store fabrication of cuts.

External

Record the production date from the box or chub.

Note: If ingredients have a different production date always start a new line on the grinding log.

5 Fresh or Frozen Storage

Record if ingredients were stored Fresh with an **F** or with a **Z** if ingredients were Frozen.

6 Date Acceptable

If ingredients were frozen and packaged to prevent freezer burn, they may be used 12 months after the production date. Place a check mark if criteria is met.

Observe store guidelines for fresh coarse ground meat and trim – ingredients stored at 0°C may be used longer than those stored at 4°C.

7 Quality Check

When opening ingredients verify that no off-odour is present and that visually ingredients appear satisfactory for ground meat production. Place a check mark if criteria is met.

GRINDING LOG

Retail Locati

1 Grinding Time and Date Year: 2005 Month: July Time	Day	2 ✓ = Internal	Ingredient Source If ingredients are externally sourced indicate supplier name	3 Species B = Beef P = Pork	4 Ingredient Production Date	5 Fresh or Frozen Storage F = Fresh Z = Frozen	6 Date Acceptable ✓ = Good
9 am	11	✓		B	July 8	Z	✓
10 am	12		Packer A	P	July 11	F	✓

14 Grinder Sanitation Check Each day the grinder is used, before the start of production perform a
the day. Remember that the grinder should also be completely cleaned between species. If the grinde
increases in shelf life and product safety may also be gained by cleaning the grinder during the day.

Grinder Sanitation Check (Please Check and Initial): ☑ Mon. MK | ☑ Tues.

8 Ingredient Quantity

Place a check mark to indicate if kilograms or pounds are used as the unit of measurement.

Place the value in kilograms or pounds under the correct column for the ingredient type utilized.

9 Lean %

Record the lean % of each ingredient or use the selected abbreviation.

10 Meat Temperature

Record the temperature of the ingredients before grinding using a probe thermometer which is periodically checked for accuracy.

Ground meat and trim should always be kept at 4°C or lower. Optimal shelf-life will be achieved at temperatures closer to 0°C. It is especially important for food safety reasons that ground meat and trim be kept under 5°C as at this temperature if any dangerous *E. coli* bacteria are present they will not grow. Remember that meat temperature will rise due to friction from grinding.

11 Clip Check

When removing clips from chubs ensure they are all properly disposed of and then place a check mark.

12 Additional Information

This space can be used to record any information that the retailer wishes to capture (such as temperature of product exiting the grinder).

13 Staff Initial

The individual who is performing the grinding process should initial indicating information recorded is accurate.

14 Grinder Sanitation Check

Each day the grinder is used, before the start of production, perform an inspection to ensure that grinder is visually clean and dry. If satisfactory record your initials by the day.

Remember that the grinder should also be completely cleaned between species. If the grinder is used in warm conditions where air temperature is significantly greater than 4°C substantial increases in shelf-life and product safety may also be gained by cleaning the grinder during the day.

Records Storage

Grinding logs should be filed and kept on the premises for a period of at least one month.

Items Requiring Corrective Action

If during the course of filling out the grinding log you find that ingredients are not satisfactory for use, place the suspect ingredients in a location where they will not be used and inform your supervisor or take action according to your store policy. Record the details on the back of the grinding log so you may refer to it at a later time.

on: Store Name

7 Quality Check	8 Ingredient Quantity ☑ Kilograms ☐ Pounds				9 Lean % F = fat trim, EX = extra lean, L = lean, R = regular, M = medium		10 Meat Temp. ☑ °C ☐ °F	11 Clip Check	12 Additional Information	13 Staff Initial
✓= Good	Rework	Trim	Ground Meat	Whole Muscle	Type	Percentage		✓= Good	Post grinding temp.	
✓		56			M		0	✓	1°C	MK
✓		50				75%	2	✓	3°C	TL

an inspection to ensure that grinder is visually clean and dry. If satisfactory record your initials by
er is used in warm conditions where air temperature is significantly greater than 4°C, substantial

TL | ☐ Wed. ____ | ☐ Thurs. ____ | ☐ Fri. ____ | ☐ Sat. ____ | ☐ Sun. ____

GRINDING LOG

Retail Location:

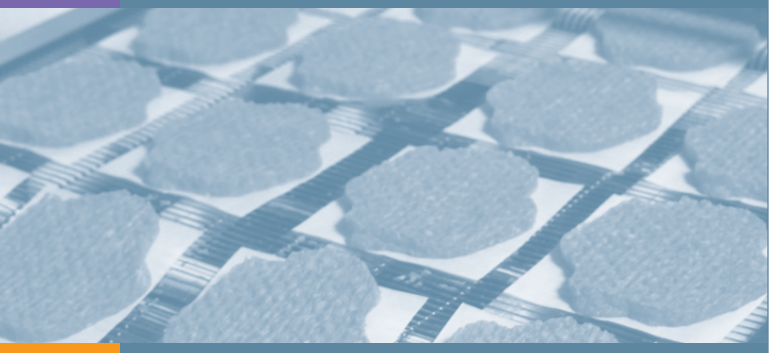
Grinding Time and Date Year: Month: Time	Day	Ingredient Source ✓ = Internal	If ingredients are externally sourced indicate supplier name	Species **B** = Beef **P** = Pork	Ingredient Production Date	Fresh or Frozen Storage **F** = Fresh **Z** = Frozen	Date Acceptable ✓= Good	Quality Check ✓= Good	Ingredient Quantity ☐ Kilograms ☐ Pounds Rework	Trim	Ground Meat	Whole Muscle	Lean % **F** = fat trim **EX** = extra lean **L** = lean **R** = regular **M** = medium Type	Percentage	Meat Temp. ☐ °C ☐ °F	Clip Check ✓=Good	Additional Information	Staff Initial
EXAMPLE 9 am	11	✓		B	July 8	Z	✓	✓		56			M	75%	0	✓		MK

Grinder Sanitation Check Each day the grinder is used, before the start of production perform an inspection to ensure that grinder is visually clean and dry. If satisfactory record your initials by the day. Remember that the grinder should also be completely cleaned between species. If the grinder is used in warm conditions where air temperature is significantly greater than 4°C, substantial increases in shelf-life and product safety may also be gained by cleaning the grinder during the day.

Grinder Sanitation Check (Please Check and Initial): ☐ Mon. _____ | ☐ Tues. _____ | ☐ Wed. _____ | ☐ Thurs. _____ | ☐ Fri. _____ | ☐ Sat. _____ | ☐ Sun. _____

FOOD SAFETY

QUALITY



PROFITABILITY

CANADA BEEF™



Ground Meat Management Checklist ✓

FOOD SAFETY

		YES	NO
RECEIVING (Page 5)			
	Each trailer containing meat products is inspected upon arrival and the inspection protocol includes monitoring to ensure that:		
B C P	trailer walls, ceilings, and floors are in satisfactory condition and refrigeration unit is functioning adequately.		
B C P	products which are incompatible with food items are not being transported e.g., cleaning chemicals.		
B	product does not show signs of temperature abuse and surface temperatures are taken when practical.		
B C P	meat product packaging is not damaged or contaminated.		
B C P	trailers or product which are found to be unsatisfactory are returned to origin.		
	Loading dock area personnel are trained to make certain that:		
B	ground meat products or ingredients are moved promptly into refrigerated or frozen storage.		
B	dock seals or other methods are utilized to ensure adequate temperature control.		
B	loading dock area is periodically cleaned, kept free of pests and garbage is removed daily.		
STORAGE AND SELECTION OF INGREDIENTS (Page 5)		YES	NO
	Storage areas are monitored daily to ensure that:		
B	ground meat ingredients are maintained at 4°C or lower.		
P	shelves and pallets used for storing products are free from physical hazards such as nails or broken boards.		
B C	facilities are clean, free of excessive condensation and do not contain items incompatible with food products.		
	Ingredients utilized for ground meat production are selected so that:		
B	product is within shelf-life specification and selected on a first in-first out basis.		
B C P	ingredients are purchased only from facilities which have documented systems for ensuring food safety.		
B	any reworked materials utilized are free from seasoning and contain no previously ground product.		
INGREDIENT INSPECTION (Page 5)		YES	NO
	All ground meat ingredients are inspected before use to make certain that:		
B C P	off-odour, excessive purge, bone-chips, cartilage, torn or ripped packaging or any condition which would make it unsatisfactory for use is not present.		
P	clips from opened chubs do not enter product.		
B C	any ground meat ingredients which have contacted unclean surfaces such as the floor are thrown away.		

Potential Hazards Controlled: B = Biological Hazard C = Chemical Hazard P = Physical Hazard

continued on next page

Note: *While the checklist does not address every aspect of management required to ensure ground meat quality, safety and profitability, establishments which satisfy the requirements indicated are typically those with above average success. The content of the checklist targets operations which produce their own fresh ground meat products such as grinds and patties. Some items will not be applicable to all operations such as those merchandising case-ready products. This checklist is not intended to advocate the use of any particular technology or approach but rather to ensure their consideration by management who can then make an assessment based on the unique circumstances of each facility. If following the completion of this exercise you would like assistance with any aspects addressed in the ground meat management manual please contact your Beef Information Centre representative.*

	GRINDER PREOPERATIONAL INSPECTION (Page 6)	YES	NO
	An inspection of the grinder is conducted before operation to ensure that:		
P	bolts, pins or other small parts are present and securely fastened, and grinder components such as grinding knife and plate are not excessively worn.		
B C	grinder has been cleaned and sanitized before operation (and between species).		
	GROUND MEAT PRODUCTION (Page 6)	YES	NO
	Established protocols for ground meat production ensure that:		
B	air temperatures are monitored at least three times per day in areas where grinding occurs.		
B	should air temperatures exceed 10°C, a complete cleanup of the grinder is undertaken every four hours.		
B	temperature of meat exiting grinder is taken once for each batch and meat is maintained at 4°C or lower.		
B C P	ingredients are documented for each batch using a grinding log.		
	PACKAGING GROUND MEAT (Page 6)	YES	NO
	Storage of packaging materials is monitored daily so that:		
C	soaker pads, trays and wrap are protected from chemicals and spray during cleaning activities.		
B	pests or other unsanitary conditions do not occur in areas containing packaging materials.		
	Employees packaging ground meat have been trained to make certain that:		
B	styrofoam trays containing ground meat are not stacked on top of each other as this could result in the bottom of a tray contaminating the meat surface of the tray beneath.		
B	following packaging ground meat is placed into refrigerated display or storage as soon as possible.		
B	packaging is securely placed so that an effective seal is maintained preventing leakage.		
	DISPLAY CASE SANITATION AND MAINTENANCE (Page 7)	YES	NO
	Display cases are monitored to ensure that:		
B	unsanitary conditions are not present and that cleaning occurs when required (weekly or more often if required).		
B C	refrigeration units are maintained and temperature measurement devices are calibrated in accordance with the recommendations of the manufacturer.		
B	in the event of refrigeration failure, ground meat products which have spent a significant amount of time over 4°C are destroyed.		
	GROUND MEAT DISPLAY (Page 7)	YES	NO
	Ground meat in the display case is monitored three times per day to ensure that:		
B	all product is below the load line, and meat surface temperature is maintained at 4°C or less.		
B	damaged, leaking packaging or other conditions which would permit contamination are not present.		
B	product outside of the display case, such as in an abandoned shopping cart, is destroyed.		
B	any expired product is removed.		
	CONSUMER EDUCATION (Page 7)	YES	NO
	To reduce the potential for foodborne illness from ground meat products:		
B	signage explaining the meaning and importance of "packaged on" or "best before" dates is utilized.		
B	labels applied to packages of ground meat contain recommendations for safe cooking and handling.		

Potential Hazards Controlled: B = Biological Hazard C = Chemical Hazard P = Physical Hazard

FOOD SAFETY *continued*

	RECALL PREPAREDNESS (Page 7)	YES	NO
	To ensure preparedness in the event of a recall:		
B C P	all ground meat safety complaints are recorded and records indicate actions taken to address any concern.		
B C P	all suppliers are required to have a written recall program and supply emergency contact information.		
B C P	adequate inventory records are maintained.		
B C P	a written protocol outlines how any recalled product would be segregated and if necessary destroyed.		

	FOOD SAFETY SYSTEMS (Page 8-9)	YES	NO
	To support a systematic approach to food safety:		
B C P	written protocols exist for prerequisite programs including sanitation, pest control and maintenance.		
B C P	all employees working with ground meats have received training informing them of the applicable actions which could be taken to reduce the risk of physical, biological or chemical hazards.		
B C P	management has received training in the principles related to a HACCP based food safety program for ground meat production and has considered its implementation.		

Potential Hazards Controlled: B = Biological Hazard C = Chemical Hazard P = Physical Hazard

QUALITY

	GROUND MEAT APPEARANCE AND PALATABILITY (Page 10-12)	YES	NO
	Personnel manufacturing ground meat products have underwent training programs which:		
	explain basic information relating to fresh and cooked ground meat appearance.		
	outline the particle sizes suitable for different classes of ground meat products.		
	illustrate optimal operation of the grinder and its contribution to ground meat texture.		
	summarize the requirements relating to fat content in extra lean, lean, medium and regular ground meat items.		
	provide information on the attributes of source grinds such as ground chuck, sirloin, and round.		

	GROUND MEAT SHELF LIFE (Page 13-14)	YES	NO
	To assist the retail operation in maximizing shelf-life:		
	samples of ground meat from the grinder are periodically sent for microbial (total aerobic count) testing.		
	shelf-life efficiency is periodically calculated for ground meat products in storage and on display.		
	management monitors the type, wattage and placement of lighting used in display cases containing ground meat products.		
	protocols ensure that non-essential light exposure for ground meat products is effectively minimized.		
	the use of ingredients which may extend shelf-life, such as beef from cattle fed supplementary vitamin E, is considered.		
	management has assessed the potential contribution of modified atmosphere packaging for ground meat products.		

	NUTRITIONAL LABELING (Page 15-16)	YES	NO
	To ensure any applicable regulatory requirements relating to nutritional labeling are satisfied:		
	management is aware of the specific requirements for labeling ground meat items which are typically in inventory.		
	any required labels are available and staff have been trained to understand their significance and proper placement.		
	systems have been developed to ensure that the composition of ground meat products are within label specifications.		

PROFITABILITY

FINANCIAL ANALYSIS (Page 17)	YES	NO
Recognizing the importance of financial analysis to operational decision making:		
management personnel have received training in relation to fundamental aspects of financial management.		
management periodically reviews key financial parameters for ground meat products such as contribution margin.		
consideration has been given to utilizing financial analysis software such as the Beef Information Centre Financial Tools.		
PURCHASING GROUND MEAT INGREDIENTS (Page 18-20)	YES	NO
To maximize the effectiveness of ingredient purchasing:		
when shop trim is a major component utilized in ground meat production a trim cost analysis is periodically conducted.		
individuals involved with procurement functions have been trained in the basic principles of least cost formulation.		
points requiring specification for all ground meat ingredients are understood and communicated by purchasing personnel.		
PRODUCTION PLANNING (Page 21)	YES	NO
To maximize ground meat sales and revenues:		
production logs are utilized on at least a periodic basis to determine purchasing patterns.		
a production efficiency analysis is conducted on a scheduled basis for all ground meat products produced.		
financial analysis is performed to determine strategies to reduce discounted or expired product such as a frozen pattie program.		
MERCHANDISING (Page 22-26)	YES	NO
To ensure effective ground meat merchandising:		
personnel are familiar with consumer purchasing trends in the operation and for the industry.		
management recognizes the costs and benefits of point of sale information and labeling for ground meat promotion.		
the operation is able to develop and implement a display case merchandising strategy which reflects seasonal trends and leverages traffic flow generated by ground meat items.		
personnel are knowledgeable of the types of branded programs represented by ground meat products in inventory and can effectively communicate their most significant attributes to support sales.		
management have a basic understanding of the attributes associated with certified organic and natural meat items.		
a financial assessment to determine the actual (or potential) contribution of source ground meat items has been performed.		
an analysis of the costs and benefits of case-ready ground meats has been conducted by management.		
promotion efforts which include nutrient content claims and/or programs such as Health Check™ have been considered.		