

HOW MUCH MEAT TO EXPECT FROM A BEEF CARCASS

INTRODUCTION

Consumers who buy a live animal from a local cattle producer for custom processing are often surprised. Some are surprised at the quantity of meat and amount of freezer space they need. Others may be surprised that they did not get the entire live weight of the animal in meat cuts. The amount of meat actually available from a beef animal is a frequent source of misunderstanding between consumers, processors and cattle producers. This article provides information to assist in the understanding of how much meat to expect from a beef carcass. The information provided here should be helpful. To consumers who purchase a live animal for freezer beef and to cattle producers involved in direct and retail meat marketing.



DRESSING PERCENTAGE

One of the terms used in the cattle and meat cutting industry that often leads to misunderstanding is dressing percentage. The dressing percentage is the portion of the live animal weight that results in the hot carcass. The dressing percentage is calculated as: (hot carcass weight ÷ the live animal weight) x 100

The hot carcass weight (HCW) is the weight of the unchilled carcass in pounds after the head, hide and internal organs have been removed. For most fed cattle, the HCW will be approximately 60 to 64 percent of the live animal slaughter weight. However, the HCW can vary greatly from one animal to another.

For a 544 kg animal with a hot carcass weight of 340 kg, the dressing percentage is 62.50 and calculated as follows:

$$\textbf{(340 kg hot carcass weight} \div \textbf{544 kg live weight) x 100}$$
$$\textbf{= 62.50 percent}$$

It is not uncommon for the buyer of a live animal to say, “The dressing percentage of my 544 kg steer was 62.5 percent but I only got 204 kg of meat – where is the rest of the meat?” The calculation of dressing percentage is based on the hot carcass weight. The hot carcass weight includes bone, excess fat and moisture loss that will not be packed and wrapped for home consumption. The hot carcass weight is not the amount of meat that the consumer will put in his or her freezer.

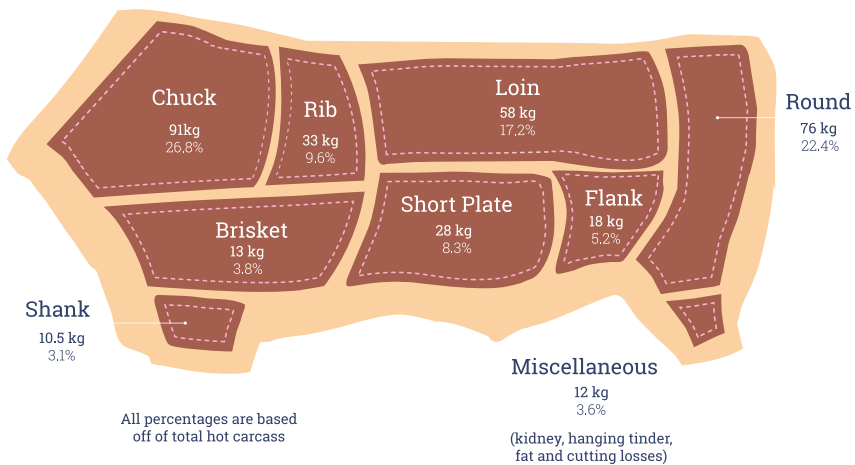
CHILLED CARCASS AND PRIMAL CUTS

The term dressing percentage is often used in the meat industry and around harvesting facilities. However, it is important to understand that dressing percentage alone does not give an accurate estimate of how much meat will be available for a consumer's freezer.

After a carcass is cooled it will be further processed into cuts of meat. The whole animal carcass will be cut into halves, and each half will be separated into the hind and front quarters. Each quarter is then separated into the hind and front quarters. Each quarter is then separated into “primal” (for wholesale) cuts. The process is referred to as “breaking down the carcass”. Beef primal cuts in the front-quarter are the rib chuck, shank, brisket and plate; the hind quarter is composed of the flank, round and loin (short loin and sirloin).

Figure 1 shows the typical weights and percent of a chilled carcass for the various primal cuts of beef from a 544 kg live steer and a 340 kg hot carcass. The round loin, rib and chuck are the major beef primals and are referred to as the “thick” cuts. The other primals are referred to as the “thin” cuts.

Figure 1. Typical Weights and Percent of a Chilled Carcass for the Various Primal Cuts of Beef from a 544 kg Live Steer (340kg hot carcass).



SUB-PRIMAL MEAT CUTS

Primal cuts will be further processed into sub-primals or into retail cuts. The basic concept of cutting beef retail cuts is to separate tender muscles from less tender muscles, to separate thick muscles from less tender muscles, to separate thick muscles from thin muscles and to separate fatter from leaner portions.

For example, according to the publication titled “Beef Cuts: Primal & Sub-primal Weights and Yields” produced by the National Cattlemen’s Beef Association, the round typically makes up 22 percent of the hot carcass – for 340 kg carcass, the round would be approximately 75 kg. The round may be further cut into 60 kg of meat that will be packed and wrapped for consumption. That is, approximately 20 percent of the round is lost to fat and bone.

The round can be fabricated into the following four sub-primal cuts plus ground beef trimmings and stew meat:

- Top round
- Bottom round
- Eye of round
- Tip (Knuckle)
- Ground beef
- Stew meat.

Factors Affecting Yield of Retail Cuts

There are several factors that can influence the amount of meat that will be wrapped for the freezer. Some of the more common factors and an explanation of each are provided below:

Carcass Fat – External carcass fatness has the greatest impact on the percent retail product from a carcass. As more fat is trimmed away from the retail cuts, less weight will be in the packaged meat and consequently a lower percentage of retail cuts from the carcass.

Carcass muscularity – Superior carcass muscling can increase the percentage of retail products. Dairy-type animals with lower lean-to-bone ratios typically yield lower than beef-type animals. Considering carcass fat and carcass muscularity, carcass fat has greater impact on decreasing yield than carcass muscularity's impact on increasing yield.

Cutting style – Cutting style or the cutting directions given to the processor can affect carcass yields. The major effects of cutting style can be explained by the amount of bone-in versus boneless cuts, trimming of retail cuts and the amount of fat in the



ground beef. Because bone can weigh quite a lot, the more bone that is left in retail cuts results in more packaged meat weight and thus an increase in percentage yield. Conversely, if the chuck and round roasts are boneless, the rib is cut entirely into boneless steaks, the loin is cut into tenderloin and strip steaks, and the short ribs put into ground beef; then considerable bone weight has been removed and the percent yield of retail cuts will be much lower. Going to a 3mm trim or a no-trim (no external fat) on the retail cut or producing an extra-lean ground beef will also lower the percentage of take-home product. As with external fat, the more fat that is removed, the less weight is put in the packages.

Aging - the two major advantages of aging meat are the improvement in tenderness and the enhancement of a "beefy" flavour. A typical aging period of seven to 10 days will optimize tenderness. Long-term aging also can have a negative effect on carcass yield.

With longer aging times, there is more weight loss from the carcass due to moisture evaporation. Also with longer aging time, there can be dehydration to the carcass surface. These dry, leathery areas should be trimmed away. Again, this is another weight loss that will result in lowering the carcass yield. Losses from extended aging times can be a bigger problem with carcasses with very little fat cover.

All beef animals are not the same. Therefore, the dressing percentage will change from one animal type to another. Some of the primary factors that influence the dressing percentage include the type of animal in terms of breed, live weight and how it was finished.



Table 1. shows the relative average dressing percentage for various types of beef animals and conditions.

Type/ Condition of Beef Animal	Relative Dressing Percentage
Traditional Feedlot Beef Type	62-64 percent
Restricted Feed Prior to Weighing	Higher
Cattle Weighed Without Gut Fill	Higher
Over-finished (fat) Beef Type	Higher
Under-finished (thin) Beef Type	Lower
Grass finished	Lower
Dairy Type	Lower
Pregnant Heifer	Lower
Mature Cow	Lower
Cattle Weighed With Gut Fill	Lower

Even though the factors used to calculate dressing percentage are standard (live animal weight and hot carcass weight), there are variations in how and when each of these weights are recorded. The live animal weight can vary depending on whether the live animal weight was recorded on the farm prior to transportation to the harvesting facility or immediately prior to harvesting at the harvest facility.

Also, the hot carcass weight is the weight of the carcass before it is chilled. A beef carcass is 70 to 75 percent water. As it is chilled, water evaporation will cause the carcass weight to decrease.

If the carcass weight used to calculate dressing percentage is the chilled carcass weight, then the dressing percentage will be lower than if the hot carcass weight had been used. It is not uncommon for a chilled carcass to weigh 3 to 5 percent less than the hot carcass. That is, a 340 kg hot carcass may lose 9 kg or more in evaporation in the first 24 hours of chilling. Table 2 provides an estimate of the amount of meat to expect from an average beef carcass. While the actual amount of each cut will vary based on animal type and cutting techniques, the information in Table 2 gives an estimate of the amount of meat to expect.

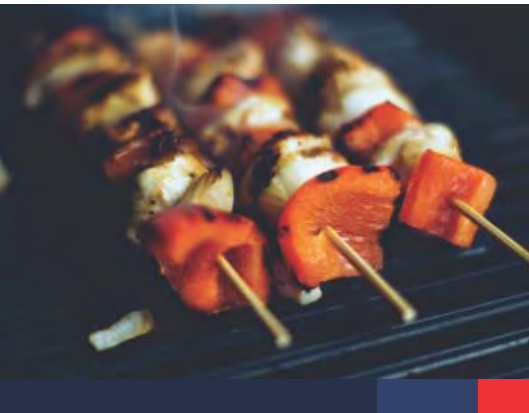


Table 2. Average Amount of Meat from a 544 kg Live Beef Animal

CUTS	Trim (mm)	Lean (%)	Ground Beef Fat (%)	Approx. amt. of freezer meat (kg)
Boneless steaks and roasts	3 mm	90	10	192.8
Bone-in steaks and roasts	6 mm	80	20	226.8
Mixture of bone-in and boneless steaks and roasts	3 mm	80	20	222.3
Boneless steaks and roasts from very fat animal	3 mm	90	10	158
Boneless steaks and roasts from Holstein (dairy animal)*	3 mm	90	10	180

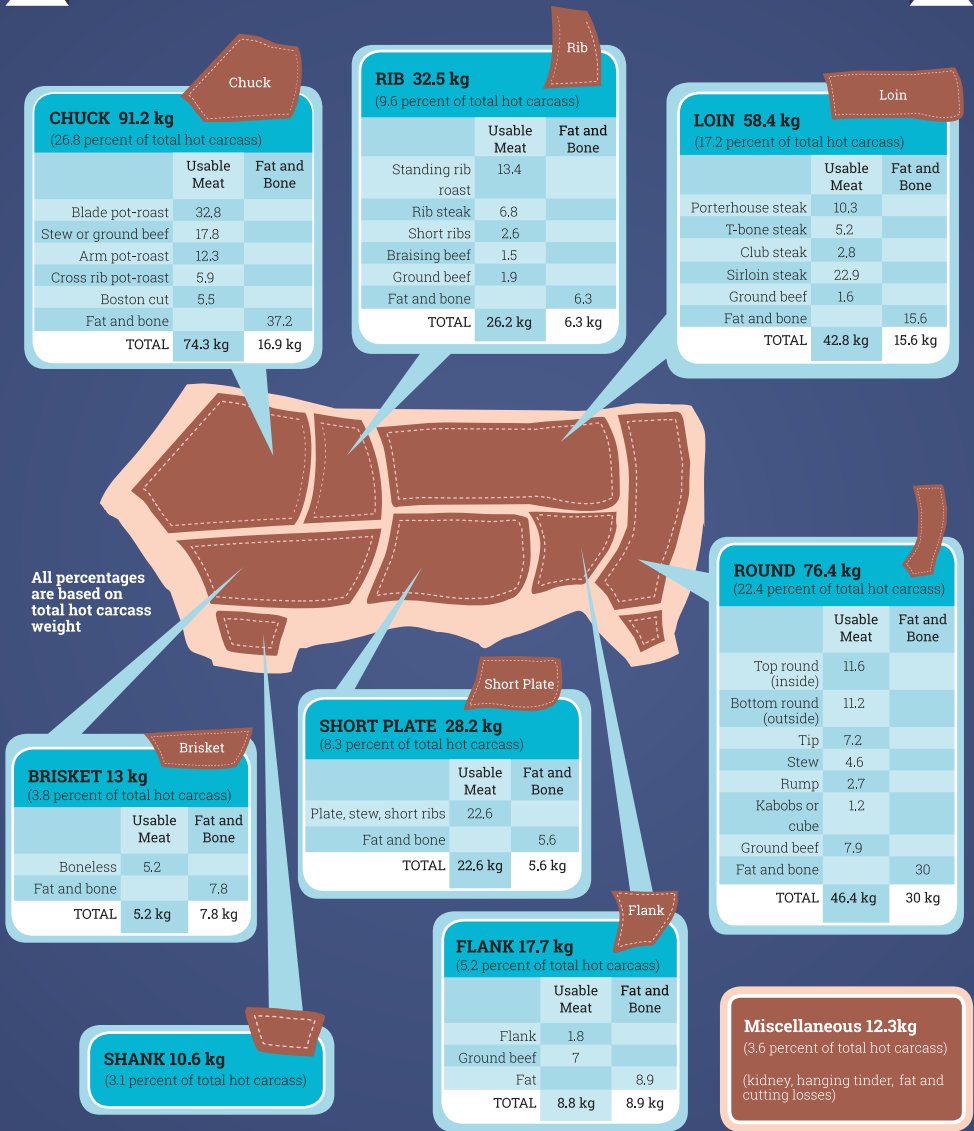
*A Holstein steer was used in the example to show how a light-muscled animal will affect the amount of take-home product. Source: South Dakota State University. Note: Estimation may vary by 11 kg pounds or more.

AVERAGE AMOUNT OF MEAT FROM EACH SUB-PRIMAL CUT

Less than half of a live animal's weight at harvest is actually available as various meat cuts for take-home beef. For example, a 544 kg steer with a 62.5 percent dressing percentage yields a hot carcass of 340 kg. After further processing and dehorning, approximately 239 kg of meat will be wrapped for consumption. Figure 2 shows the amount of meat that can result from each primal and sub-primal beef cut.



Figure 2. Amount of Meat that Can Result from Each Primal and Sub-primal Beef Cut.



Summary

The amount of meat that is cut and wrapped for consumption will be much less than the live animal weight. A 544 kg beef animal will yield a hot carcass weight of approximately 340 kg. Once cooled, the carcass weight will be approximately 331 kg. When deboned and trimmed, there will be approximately 227 kg of trimmed and deboned meat for wrapping and freezing.



Table 3. shows the average weight and percentages s the live animal weight is processed into trimmed and boneless cuts.

	Weight (kg)	(%) of live weight	(%) of hot carcass	(%) of chilled carcass
Live Animal	544	100%		
Hot Carcass	340	62%	100%	
Chilled Carcass	331	60.8%	97%	100%
Trimmed and Boneless cuts	227	71.7%	66%	68%

It is important to understand that these numbers will vary based on many factors. Not all harvested animals weigh 544 kg – some may be harvested at 408 kg and some at 590 kg. Some animals may be dairy-type and others may be beef-type. Some may be grass-finished and some may be grain-finished. Many factors can affect the dressing percentage. Anything that adds to the weight of the live animal but does not appear on the carcass will lower the dressing percentage.

Items that might add to the live animal weight but not be included in the jot carcass weight include –

- Hide
- Pregnancy
- Horns
- Mud and or manure on the hide
- Gut fill ■

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