The accurate evaluation of market cattle is highly dependent on an individual’s knowledge of the variables affecting animal composition. The primary composition factors that are of concern visually are fatness and muscling. These factors, combined with knowledge of animal age, weight, breed, and rearing conditions, enable the experienced animal judge to make relatively accurate estimates of an animal’s expected carcass characteristics. Following are some key factors, ranges of variation, and composition and grading tendencies that are essential to the evaluation of market cattle. These guidelines apply primarily to work with young cattle (12 to 24 months of age).

1. **Dressing Percent - Calculation:** \[ DP = \left( \frac{\text{hot carcass weight}}{\text{live weight}} \right) \times 100 \]
   - **Normal Range:** Beef cattle 58-65%  Dairy cattle 55-62%
   - **Average:** Beef cattle 62-64%  Dairy cattle 58-60%

   Dressing percentage (DP) reflects the proportion of a live animal’s weight made up by its carcass. Some major factors that affect DP are stage of maturity, weighing conditions, muscling, hide weight (thickness and amount of mud), fill (amount of stomach content) and fatness. If weighing conditions (i.e., time off feed and water, scales, etc.) are not standardized, DP is very difficult to accurately assess.

2. **Fat Cover - Measured between 12th and 13th ribs (over ribeye).**
   - **Range:** .10 - 1.2 in.
   - **Visual Reference Points to Assess Fat:**
     - Beef Average: .40 - .7 in.
     - Dairy Average: .20 - .4 in.
   - 1. Brisket  4. Twist
   - 2. Fore and Rear Flank  5. Tail
   - 3. Top (Rib, Loin, Rump)

   **Note:** Remember, fat fills in seams between muscle groups and deposits in non-muscular areas. Therefore, the smoother an animal appears, the fatter it usually is. Minor breed variations occur in patterns of fat deposition.

3. **Ribeye Area (muscling) - Measured between 12th and 13th ribs.**
   - **Area expressed in square inches (sq. in.) of longissimus muscle (loin muscle)**
   - **Normal Range:** 11.0 - 18.0 sq. in.

   The average ribeye size is relatively dependent on weight and averages approximately 1.0 - 1.2 sq. in. per 100 pounds of live weight in beef cattle and approximately .8 - 1.0 sq. in. per 100 pounds in dairy cattle.

   **Visual Reference Points to Assess Muscling:**
   - 1. Sex (Heifer, Steer, Bullock)  4. Bulge of round
   - 2. Weight  5. Thickness and bulge of forearm
   - 3. Thickness of lower round  6. Shape of top (Muscle expression)

4. **Yield Grading Beef**
   - **Yield grades range from 1.0 to 5.9**
   - **Average yield grade:** 2.5 to 3.3

   Yield grade predicts the percentage of semi-boneless, closely trimmed retail cuts from the round, loin, rib and chuck. Lean, muscular animals have high yields of retail product and low numerical yield grade scores (1 or 2). Excessively fat animals have numerically high yield grade scores (4 or 5) with low yields of retail product.

   **Four factors used:**
   - 1. Fat cover (Average for beef cattle .4 - .7 inches, dairy steers .2 - .4 inches)
   - 2. Ribeye area (ranges from 10 – 16 square inches)
   - 3. % Kidney, heart and pelvic fat (% KHP) (average = 2.0 - 2.5%)
   - 4. Hot carcass weight (ranges 600 – 1000 lbs.)

   Of the beef graded in 2005, 10% = YG1; 42% = YG2; 41% = YG3; 6% = YG4; 1% = YG5.
5. **Quality Grading**

USDA quality grades are based only on maturity and marbling. Since most market cattle evaluated are young (A Maturity and less than 24 months of age), their quality grade is based almost entirely on marbling, which is visually evaluated in the ribeye. The chart below defines the relationship between marbling and maturity for beef quality grades.

![Marbling Chart]

1. Assumes that firmness of lean is comparably developed with the degrees of marbling and that the carcass is not a “dark cutter.”
2. Maturity increases from left to right (A through E).
3. The A maturity portion of the Figure is the only portion applicable to bullock carcasses.

Marbling content depends on the following three factors (plus others not listed):

1. Breed/Genetics
2. Feeding program (diet composition and days on feed)
3. Composition maturity (age when fat is deposited)
4. Management (i.e. growth promoters) and health

Marbling content is difficult to estimate in the live animal but is related to fatness. Often the only indication of the previously listed factors is fat cover as visually determined. Fatter animals tend to grade higher (Prime or Choice) than do leaner animals. However, unpredictable exceptions occur quite frequently. It is not uncommon to have cattle with more than .8 inch fat grade Select or those with .15 inch grade Choice. Of all the beef graded in the U.S. in 2005, 3% were graded Prime, 58% Choice and 39% Select. Many more cattle qualify for Select than are reported (Note: Grading is voluntary.) and are marketed as nongraded or housebrand beef.

Genetics plays a strong but rather unpredictable role in beef quality grades. The following guidelines for breed and fat cover may assist in determining quality grade. These are only guidelines and not perfect by any means.

<table>
<thead>
<tr>
<th>Breed</th>
<th>Prime</th>
<th>Select</th>
<th>Choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angus or Shorthorn</td>
<td>≤ .30</td>
<td>.40 to .70 in.</td>
<td>&gt; .70 in.</td>
</tr>
<tr>
<td>Hereford</td>
<td>&lt; .50</td>
<td>≥ .50</td>
<td>Low Probability</td>
</tr>
<tr>
<td>Holstein</td>
<td>&lt; .15</td>
<td>.15 to .40</td>
<td>&gt; .40</td>
</tr>
<tr>
<td>*Charolais, Simmental</td>
<td>≤ .30</td>
<td>.40 to .80</td>
<td>&gt; .80</td>
</tr>
</tbody>
</table>

*Continental breeds tend to be trim at market weights of 1,000-1,200 pounds, and have not reached compositional maturity. This is the primary reason they tend not to grade Choice as easily as some smaller / more moderate framed breeds. The same influence occurs in large-framed British-bred animals or crossbreeds. To the contrary, Holsteins, while not prone to heavy fat deposition, often grade Choice (and even Prime) readily. Standard grade carcasses are generally from cattle that have not been sufficiently fed or in cattle raised in alternate systems with a marginal energy balance.