



## ● Fat Colour (FC)

Fat colour is the colour of Intermuscular fat lateral to the rib eye muscle. It is assessed on the chilled carcass and scored against the AUS-MEAT Fat Colour Reference Standards. Fat Colour is assessed by comparing the Intermuscular fat colour lateral to the M. longissimus dorsi and adjacent to the M. iliocostalis with the reference standards. Where a Fat colour score falls between two of the reference standards, the number corresponding to the more yellow of the reference standards is assigned to the carcass.



## MSA Grading Compliance

Carcasses that fail to comply with MSA specifications are subsequently ungraded to non-MSA product.

### The factors that downgrade carcasses are:

- Rib Fat (less than 3mm)
- Ossification maturity (300 score or more)
- Fat Distribution (uneven distribution over the loin, butt and forequarter)
- pH (5.71 and above)
- Meat Colour (4 and above)
- Miscellaneous (bruising, ecchymosis, etc.)
- Temperature (must be below 12 degrees celsius)
- Hide Puller Damage (excess damage to the carcass over primal cuts)
- Company Specification (at the discretion of the Establishment where carcasses are presented for grading)

(Meat and fat colours displayed are a guide only and not a true re-presentation)



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# Meat Standards Australia Carcase Grading System



## ● What is MSA?

Meat Standards Australia (MSA) is the culmination of many years of research, testing the on-farm, processing, carcass, breeds, ageing and cooking effects to determine their individual and collective effect on eating quality.

The MSA system began as an industry program, which commenced in 1996 following detailed consumer research investigating the continuing decline in beef consumption. The key problems identified in MSA research were a reduced level of cut and cooking knowledge among consumers and the degree of quality variation in the beef available.

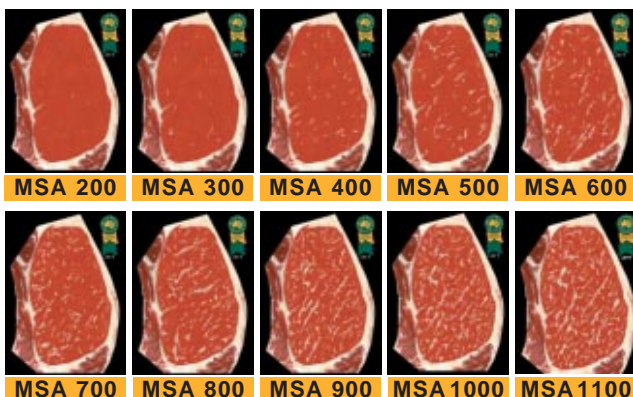
The MSA grade is established by calculating both the direct and interactive effects of all the factors tested and proven to vary eating quality. Over 57,000 consumers have participated in MSA consumer sensory panels providing scores on 400,000 beef samples from 40,000 cuts. (May 2003).

This allows MSA grading to provide a consumer guarantee of eating quality at four levels in conjunction with cooking method to provide consumers with all they need to know about purchasing and preparing beef with confidence.

## ● MSA Marbling (MSAMB)

Marbling is the fat that is deposited between individual muscle fibres of the longissimus dorsi muscle.

The assessment of marbling provides an indication of distribution and piece size as well as the amount of marbling. The steps between the MSA marbling standard photographs are judged to tenths for grading, creating a score range from 100 to 1100 in increments of ten. Marbling is assessed at the M. longissimus dorsi at the ribbing site of the carcass, and is calculated by evaluating the amount, piece size and distribution of marbling in comparison to the MSA standards.

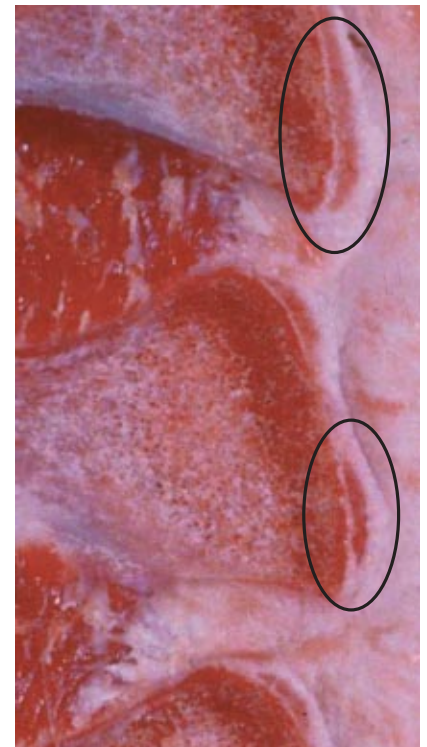


### Key point:

- Eating Quality increases as Marbling increases.

## ● Maturity (or Ossification) (OSS)

Maturity scoring provides a scale for the assessment of physiological age of a bovine animal. The term refers to the cartilage turning to bone in the spinous processes in three sections along the backbone- sacral (tail), lumbar (loin) and thoracic (head). The process starts in the sacral region in the form of red spots and as the process increases turns to hard, yellow bones. The shape and colour of the rib bones are also used to determine scores. Maturity is measured in increments of ten with the lowest being 100 and the highest being 590. Carcasses achieving a score of 300 (approximately 42 months) or more are automatically downgraded. As more research is conducted Standards are constantly reviewed to ensure evaluation of eating quality for consumers.

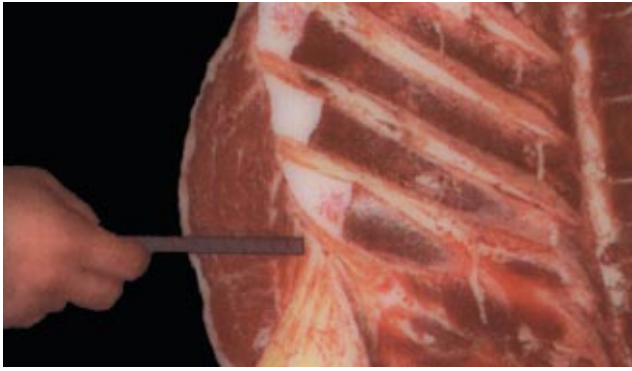


### Key point:

- Eating Quality declines as ossification increases
- Ossification increases as the animal ages but can also increase if the animal is subjected to nutritional or health stress

## ● Hump Height (Hump HT)

Animals of the same breed type can show different levels of visual (phenotypic) Tropical Breed Content. The hump is measured by holding a ruler parallel to the ribs. The ruler is moved to position the greatest hump width and includes all of the meat from the top (dorsal) edge of the paddywhack (ligamentum nuchae) and across to the top (dorsal) surface of the rhomboideus (hump) muscle. Hump height is measured in gradients of 5-mm and is primarily used to verify the Tropical Breed Content indicated on the MSA vendor declaration.



**Key point:**

- Hump Height and Carcase Weight can estimate a Tropical Breed Content for cattle with no pre-described percentage.

● **Ultimate pH (pHu)**

Ultimate pH is a measurement of lactic acid within the muscle. Measurements are taken from a pH probe that is calibrated daily before each grade. The optimum pH level of meat is 5.3 - 5.7, with levels above this being downgraded to non-MSA product. When measured correctly, pH is one of the most accurate indicators of eating quality and is an essential part of the grading process.

The Ultimate pH is affected by treatment, temperament and condition of the live animal. The speed at which pH declines from the live state (approx pH 7.0) to the Ultimate pH affects eating quality. This is affected by post-slaughter treatments such as quantity of electrical inputs and temperature. The MSA grading system requires that the rate of pH decline is controlled.

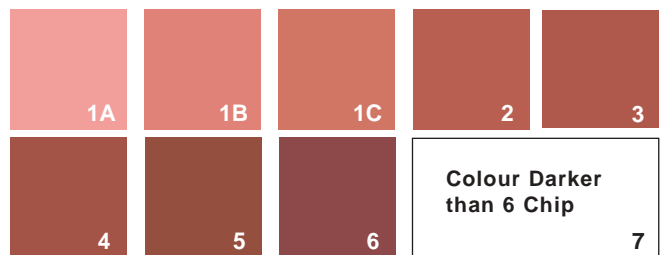


**Key point:**

- Energy (glycogen) levels in the animal are important in obtaining a pH within the acceptable range
- Stress or exertion will result in cattle losing energy
- Too slow a pH decline can lead to “cold shortening” and a reduction of eating quality.
- Too fast a pH decline can lead to “heat shortening” and a reduction of eating quality.

● **Meat Colour (MC)**

Beef Meat Colour is the colour assessed at the rib eye muscle (M. longissimus dorsi). It is assessed on the chilled carcass and scored against the AUS-MEAT Meat Colour Reference Standards in that area of the M. longissimus dorsi that displays the most predominant colour. Where there is no clearly predominant colour, the darkest significant colour is assessed and scored accordingly. Where a Meat Colour score falls between two of the Reference Standards, the number corresponding to the darker of the Reference Standards is assigned to the carcass.



**Key point:**

- ‘Dark cutting’ animals (MC 4 and greater) will result in downgrading of carcasses
- Ensuring cattle are on a rising plain of nutrition prior to slaughter will minimise ‘dark cutting’.

● **Subcutaneous Rib Fat (RF)**

Subcutaneous rib fat is a measurement in millimetres of the thickness of Subcutaneous fat at a specified rib.



**Key point:**

- A minimum of 3mm rib fat will reduce temperature variation through the carcass during chilling, which will counteract the onset of cold shortening.