Japanese Carcass Grading Standards:

The grading of meat animal carcasses is managed by the 'Japan Meat Grading Association', in the meat wholesale markets and at the meat centers established in major producing areas, throughout Japan.

Introduction

The grading is implemented according to the carcass grading standard for beef and pork, established by the association, under the approval by the director of the Animal Industry Bureau, the Ministry of Agriculture, Forestry and Fishery.

Grading of carcasses plays an important role in the establishment of appropriate prices for production and for the rationalization of distribution channels.

1. Yield Score

Yield score is determined by estimating percentage by the multiple regression equation, which includes four carcass measurements. Most measurements are obtained on the 6th to 7th rib section, as shown in the figure of ribbed carcass. Rib eye area is measured by grid and others are by scale. An additional measurement for the equation, the left side weight, is obtained from routine records.

Equation for Yield Estimation

Estimated percentage (%) = 67.37	+ (0.130 x Rib eye area cm2)
	+ (0.667 x Rib thickness cm)
	- (0.025 x Cold left side weight kg)
	- (0.896 x Subcutaneous fat thickness cm)

Note: Add 2.049 for Wagyu carcass

Yield score may be reduced by one rank, if the intermuscular fat thickness is rather thick compared to the left side weight and rib eye area or if round is too thin and the proportion of fore and hind quarters is apparently undesirable.

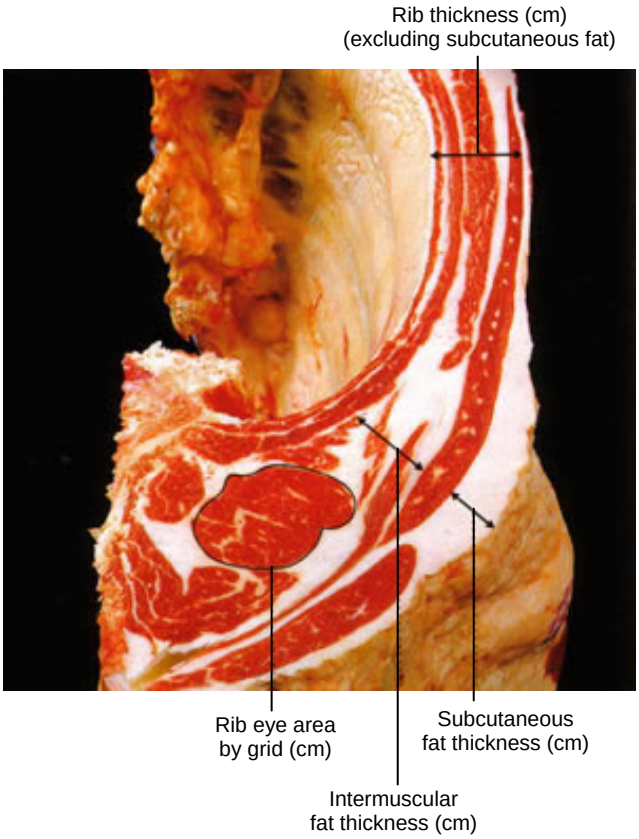
Classification of Yield Score

Yield score is classified into 3 grades, A, B and C as follows:

Grade	Yield estimated percentage	Specification
A	72% and above	Yield of total cuts is above average range
B	69% and above, and under 72%	Average
C	Under 69%	Below average range

Yield average value is determined so as to normally distribute around B rank.

Carcass Measurements on the 7th to 7th Rib Section



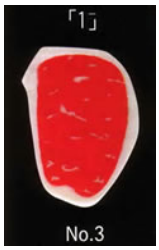
2. Meat Quality Score

Meat quality score is determined in terms of beef marbling, meat colour and brightness, firmness and texture of meat, colour, luster and quality of fat.

a) Beef Marbling

According to the results of a market survey on carcass distribution by the degree of marbling, the majority were classified in the range of “1- to 1”. This range was regarded as “Grade 3” and about 40% of marketed carcasses were included in this grade. Then, beef marbling was divided into 5 grades so as to center around the “Grade 3”. As a result of this revision, the minimum requirement of beef marbling for each grade is more fairly rearranged than in the previous grading system. In the new grading standard, twelve standards of Beef Marbling Standard (BMS) showing continuous change of the degree of marbling are adopted.

Average Beef Marbling (Grade 3)



Classification of Colour and Brightness Grade

Grade	Evaluation Standard		BMS No.
5	Excellent	2+ and above	No. 8 – No. 12
4	Good	1 to 2	No. 5 – No. 7
3	Average	1- to 1	No. 3 – No.4
2	Below Average	0+	No. 2
1	Poor	0	No. 1

The relationship between marbling evaluation and classification of grade is as follows:

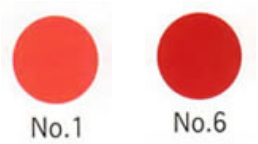
BMS No		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11	No. 12
Evaluation Statement		0	0+	1-	1	1+	2-	2	2+	3-	3	4	5
Classified Grade	New	1	2	3		4			5				
	Old	Nami			Chu			Jo			Gokujo	Tokusen	

Note: The terms used in the old grade express similar meanings in English as follows: Nami – Forth, Chu – Third, Jo – Second, Gokujo – First, Tokusen – Prime. In the new grade, such terms are simplified to Arabic figures.

b) Colour and Brightness of Meat

In this item, the meat colour is evaluated by Beef Colour Standard (BCS) prepared as seven continuous standards. Average colour range is from No. 1 to No. 6 of BCS No. and carcasses in this colour range can be graded in “Grade 3” or upper grades. Brightness of meat is evaluated by visual appraisal. At the final decision of grade of this item, both factors are considered.

Average Meat Colour Range (Grade 3 and above)



Classification of Colour and Brightness Grade

Grade	Colour BCS No.	Brightness
5 Very Good	No. 3 – No. 5	Very Good
4 Good	No. 2 – No. 6	Good
3 Average	No. 1 – No. 6	Average
2 Below Average	No. 1 – No. 7	Below Average
1 Inferior	A Grade Except 5 - 2	

c) Firmness and Texture of Meat

For this item, two factors are evaluated by visual appraisal and they are classified into five grades. At the decision of the final grade of the item, both factors are considered.

Average Firmness and Texture of Meat (Grade 3)

Classification of Firmness and Texture Grade

Grade	Firmness	Texture
5	Very Good	Very Fine
4	Good	Fine
3	Average	Average
2	Below Average	Below Average
1	Inferior	Course

d) Colour, Luster and Quality of Fat

One of the factors in this item, fat colour is evaluated by Beef Fat Standard (BFS) prepared as seven continuous standards. Average colour range is from No. 1 to No. 6, and carcass in this colour range can be graded as “Grade 3” or upper grades. The remaining two factors, luster and quality are evaluated simultaneously by visual appraisal. Three factors are considered in the decision of the final grade of the item.

Average Fat Colour Range (Grade 3 and above)

Classification of Fat Colour, Luster and Quality Grade

Grade	Fat Colour	BFS No.	Luster and Quality
5	Excellent	No. 1 – No. 4	Excellent
4	Good	No. 1 – No. 5	Good
3	Average	No. 1 – No. 6	Average
2	Below Average	No. 1 – No. 7	Below Average
1	Inferior	A Grade Except 5 – 2	

3. Determination of Overall Meat Quality Score

Overall meat quality score is graded down to the lowest grade amongst the four item as follows:

Overall Meat Quality Score	**3**
Beef Marbling	4
Colour and Brightness	4
Firmness and Texture	3
Fat Colour, Luster and Quality	4

4. Stamping of Yield and Meat Quality Score on Carcass

Final yield and carcass quality scores are indicated on carcasses by one class of the 15 combinations.

Division of Classes

	Meat Quality Score				
Yield Score	5	4	3	2	1
A	A5	A4	A3	A2	A1
B	B5	B4	B3	B2	B1
C	C5	C4	C3	C2	C1

Example of a Class Stamp

B
3

5. Damage Indication by Superscript Stamp

A carcass which is recognized to have any damage is stamped with a superscript mark classified according to the type of damage.

Example of a Damage Indication

Classification of the Type of Damage

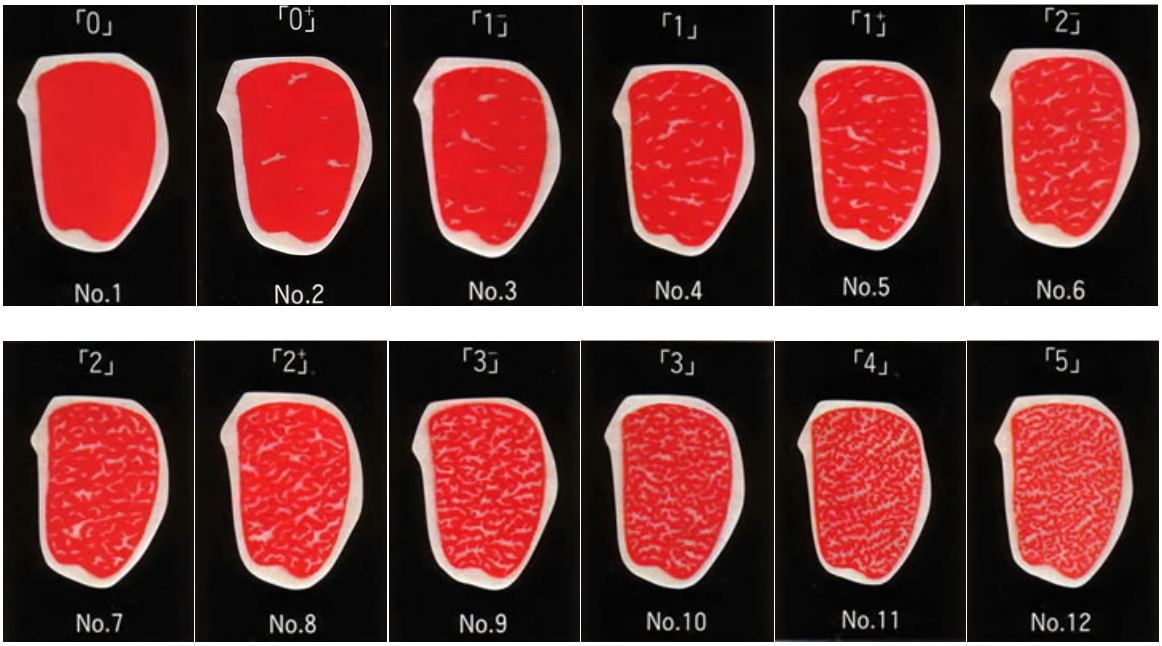
Type of Damage	**Mark**
Muscle Bleeding (Stain)	(A)
Muscle Edema	(I)
Inflammation of Muscle	(U)
External Wound	(E)
Part Missing	(O)
Other	(KA)

6. The Expected Effects of the New Beef Carcass Grading System

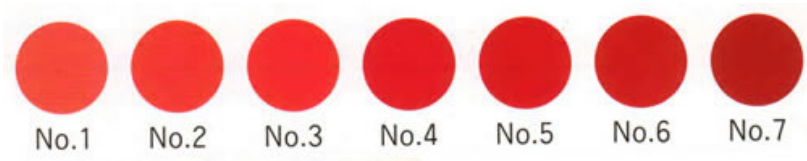
- By the introduction of yield score, a carcass which has high yield will be valued properly. Excess fat will also be controlled at the production stage.
- Meat quality score, having been the most important value standard are rearranged for beef marbling and the other related items. As a result, excessive consideration on the degree of marbling will be controlled.
- By the introduction of yield score and the moderation of meat quality score, economical beef production, adjusted to each breed's ability, should be promoted.
- The standardized ribbing, unified throughout the country, will result in more objective carcass classification and more rational marketing of carcasses and prime cuts, reflecting the different demand of each region more precisely.
- In the old grading system, standards for beef colour and fat colour were not objectively defined. Newly introduced Beef Marbling Standard (BMS), Beef Colour Standard (BCS) and Beef Fat Standard (BFS) have given additional objectivity for grading.
- The improved standards, combining yield and quality of carcasses into 15 classes, will facilitate the choice of carcass to correspond to various demands.

Beef Marbling Standard (BMS)

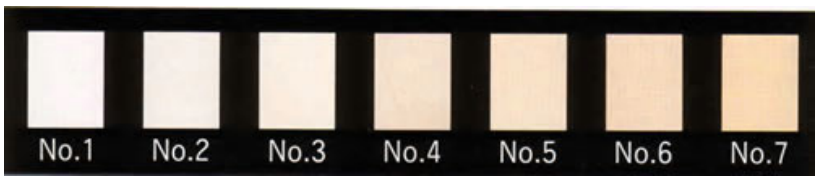
Silicone resin models are newly introduced for the evaluation of beef marbling, meat color and fat color. These models were developed by the National Institute of Animal Industry to standardize the range of the degree of marbling, meat color and fat color, according to their physical characteristics.



Beef Color Standard (BCS)



Beef Fat Standard (BFS)



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