JAPANESE MEAT GRADING

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INTRODUCTION

The Japanese meat grading standards were last changed in 1988. Beef carcasses are now cut or ribbed between the 6th and 7th rib throughout Japan. There are three yield grades: A, B and C- classified by yield percentages estimated by a regression equation. There are five quality grades: 1, 2, 3, 4 and 5 – based on marbling, meat color and texture, and fat color and quality.

If the United States is going to raise cattle for export to Japan, it is important to have a fundamental understanding of the Japanese meat grading system, since it is so different from the U.S. system. The following discussion and illustrations are not in great detail, but hopefully will give the reader some understanding of the Japanese meat grading system.

YIELD GRADE

Yield score is determined by an estimated cutability percentage that is calculated by a multiple regression equation, which includes four carcass measurements. Most measurements are obtained on the 6th and 7th rib section, as shown in the figure of the ribbed carcass. Rib-eye area is measured by a grid, and a ruler is used to obtain the other measurements. An additional measurement for the equation, the left side weight, is obtained from routine records. <u>*Note*</u>: All measurements are metric.

EQUATION FOR YIELD ESTIMATION

Estimated percentage (%) = 67.37	+ (0.130 X Rib-eye area cm^2)
	+ (0.667 Rib thickness cm)
	- (0.025 X Cold left side weight kg)
	- (0.896 X Subcutaneous fat thickness cm)

<u>*Note*</u>: Ad 2.049 for Wagyu carcass.

Yield score may be reduced by one rank, if the intermuscular (seam) fat thickness is rather thick, compared to 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,	Average and under 72%
C	Under 69%	Below average range

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

The meat quality scores are determined in terms of beef marbling, meat color and brightness, firmness and texture of meat, color, luster and quality of fat.

BEEF MARBLING

CLASSIFICATION OF BEEF MARLBING GRADE

	Grade	BMS No.
5	Excellent	No. 8 – No. 12
4	Good	No. 5 – No. 7
3	Average	No. 3 – No. 4
2	Below Average	No. 2
1	Poor	No. 1

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

COLOR AND BRIGHTNESS OF MEAT

In this item, meat color is evaluated by Beef Color Standard (B.C.S. No.) prepared as seven continuous standards. Average color range is from No. 1 to No. 6 of B.C.S. No., and carcasses in this color 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.

CLASSIFICATION OF COLOR AND BRIGHTNESS GRADE

Grade	Color B.C.S. 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	

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.

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	Coarse

COLOR, LUSTER AND QUALITY OF FAT

One of the factors in this item, fat color, is evaluated by Beef Fat Standards (B.F.S.) prepared as seven continuous standards. Average color range is from No. 1 to No. 6, and carcass in this color 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.

CLASSIFICATION OF FAT, COLOR, LUSTER AND QUALITY GRADE

Grade	Fat Color	B.F.S. No.	Luster and Quality
	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

DETERMINATION OF OVERALL MEAT QUALITY GRADE

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

Beef Marbling	4
Color and Brightness	4
Firmness and Texture	3
Fat Color, Luster and quality	3
Overall Meat Quality grade	3

STAMPING OF YIELD AND MEAT QUALITY SCORE ON CARCASS

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

DIVISION OF CLASSES

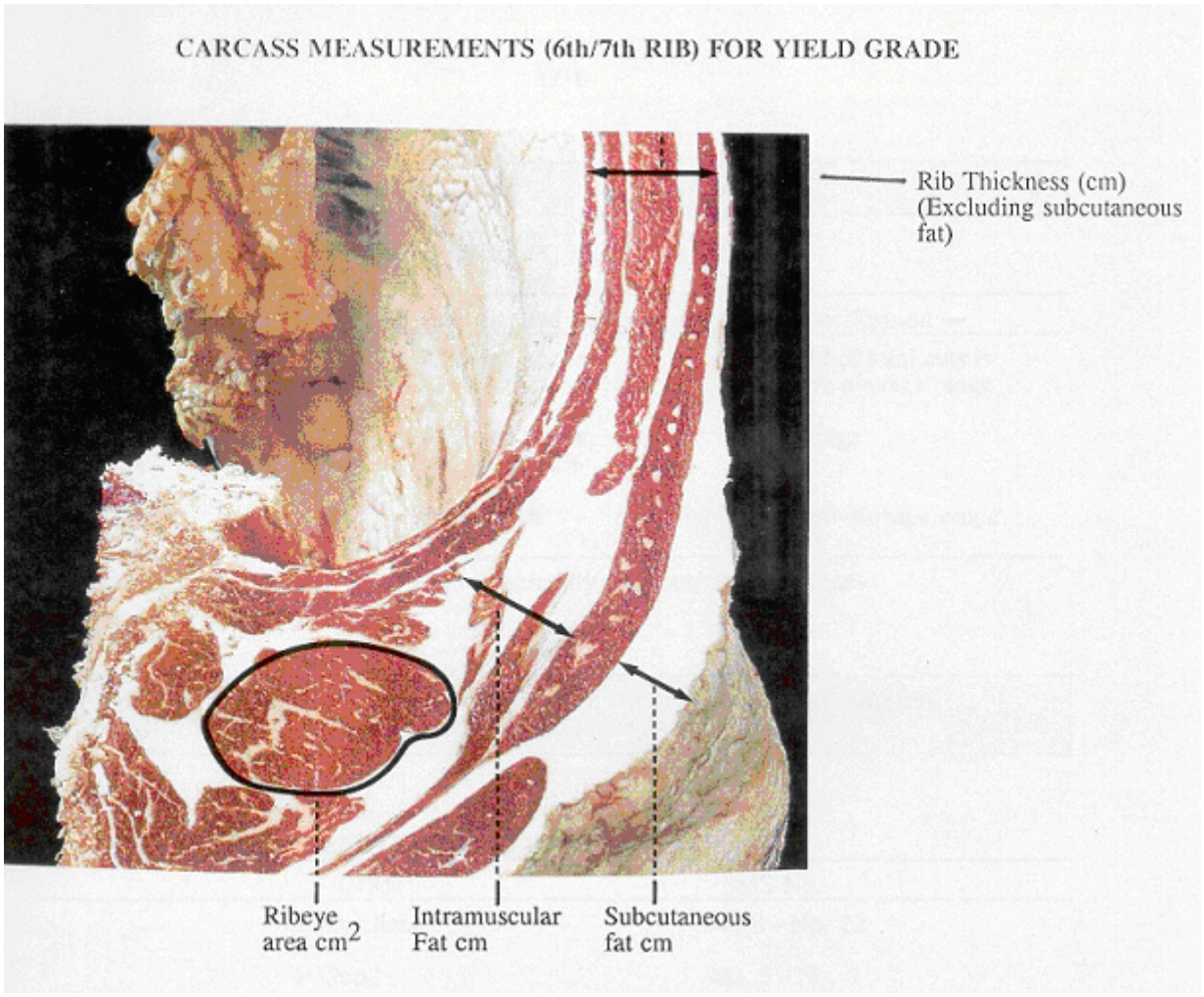
	Meat Quality Score				
Yield Score	5	4	3	2	1
A	A5	A4	A3	A2	A1
B	B5	B4	B3	B2	B1
C	C5	C4	C3	C2	C1

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.

CLASSIFICATION OF THE TYPE OF DAMAGE

Type of Damage	Mark
Muscle bleeding (stain or blood splash)	(A)
Muscle edema	(I)
Inflammation of muscle or fat infiltration	(U)
External wound	(E)
Part mission	(O)
Other	(KA)



Beef Color Standard (BCS)

No.1	No. 2	No.3	No.4	No.5	No.6	No.7
2-3	4	5	5	5	4-3	2

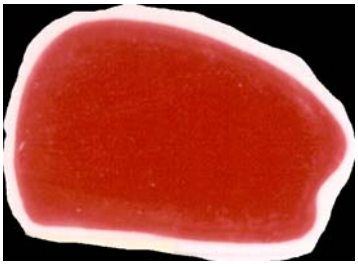
First row gives the BCS number and the second row gives the Quality Grade

Beef Fat Standard (BCS)

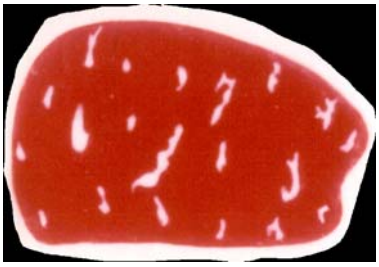
No.1	No. 2	No.3	No.4	No.5	No.6	No.7

BFS numbers

Beef Marbling Standards


BMS # 1 Quality Grade 1


BMS # 2 Quality Grade 2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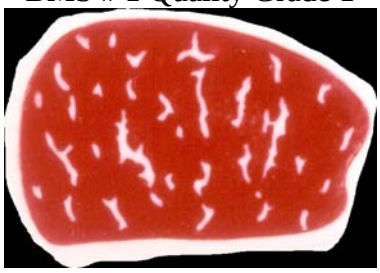
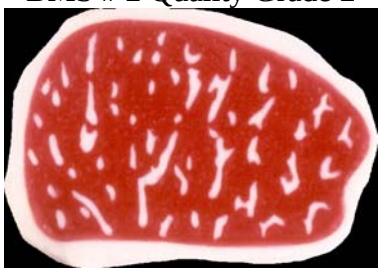
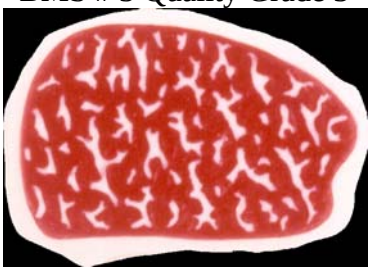
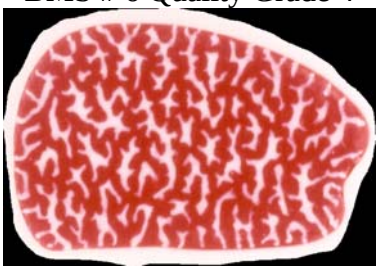

BMS # 4 Quality Grade 3


BMS # 5 Quality Grade 4


BMS # 6 Quality Grade 4


BMS # 7 Quality Grade 4


BMS # 8 Quality Grade 5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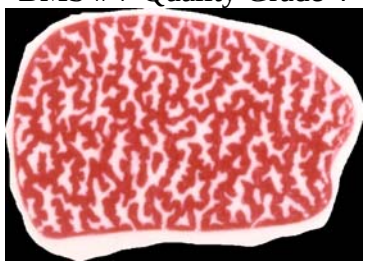
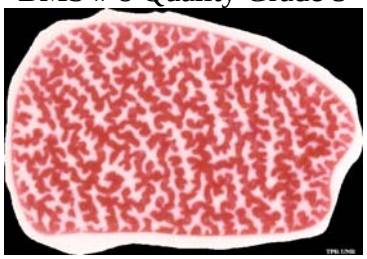

BMS # 10 Quality Grade 4


BMS # 11 Quality Grade 5


BMS # 12 Quality Grade 5

Equivalence of U.S. and Japanese Marbling Scores

U.S.D.A. Quality Grade	U.S.D.A. Marbling Score*	BMS Number	Japanese Quality Grade
	Extremely Abundant 50+	11 or 12	5
	Extremely Abundant 0-49	10	5
	Very Abundant 50-99	9	5
	Very Abundant 0-49	8	5
	Abundant	7	4
	Moderately Abundant	6	4
Prime	Slightly Abundant	5	3
	Moderate	4	3
	Modest	3	3
Choice	Small		
Select	Slight		
	Traces		

* There are no official grades above Abundant in the USDA specifications. The terms Very Abundant and Extremely Abundant are arbitrary.