

MSA Eating Quality Guide

TO BEEF SUBPRIMALS



Foreword

Meat Standards Australia (MSA®) is the result of many years of research, determining the effect of on farm practices, processing techniques, carcase attributes, product ageing and cooking on eating quality of beef and sheepmeat.

What is MSA?

MSA is an eating quality grading system for beef and sheepmeat. It accurately predicts the eating quality for individual beef and lamb cuts in conjunction with cooking method. The complex series of factors throughout the supply chain that impact on eating quality are taken into account in production and processing to MSA standards. This solves the longstanding consumer problems of selecting beef and lamb for an appropriate cooking method.

By understanding and controlling the factors that affect eating quality, the industry has the potential to improve eating quality and reduce variability in beef and lamb products ultimately eliminating meal experience failures.

How did MSA begin?

MSA began as a commercial industry program for beef in 1998 and sheepmeat in 2007 following detailed consumer research. 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 products available.

Meat and Livestock Australia (MLA) with the support of research partners and the industry have defined best practice procedures through the identification of critical control points for eating quality. The results provided tools to monitor, appropriately manage and improve eating quality to match consumer requirements.

The consumer standard

A total consumer focus has been the foundation of MSA development. The eating quality of MSA product is established by calculating the direct and interactive effects of all factors that affect eating quality.

More than 1.2 million beef and sheepmeat samples have been tested in MSA consumer testing, providing a large database that has been used to create a powerful eating quality prediction model.

This resource, **'MSA eating quality guide to beef subprimals'** will focus on MSA beef cuts. It is an integral part of capturing further value from the MSA program and is designed as a valuable training tool and reference source.



Contents

Content	H.A.M. code
MSA – eating quality program	
how to use this book	
cooking methods	
beef primal and subprimal cuts	
rump	2090
(a) eye of rump	2093
(b) eye rump centre	2095
(c) eye rump side	2094
(d) rump cap	2091
(e) rump flap	2096
(f) tri-tip	2131
tenderloin	2150
(a) butt tenderloin	2170
(b) tenderloin butt off	2168
striploin	2140
short loin	1552

Page

Content	H.A.M. code	Page	Content
knuckle	2070	16	chuck
(a) eye of knuckle	2067	17	(a) chuck crest
(b) knuckle undercut	2069	17	(b) chuck roll plate
(c) knuckle cover	2068	17	(c) chuck pieces
topside	2000	18	(d) chuck rib side
(a) topside cap off	2001	18	brisket point end
(b) eye of topside	2013	18	brisket navel end
(c) topside cap	2012	18	brisket point end (deckle o
outside flat	2050	19	flank steak
eye round	2040	19	external flank plate
cube roll	2244	20	internal flank plate
(a) rib eye muscle	2245	20	shin
(b) cube roll plate	2229	20	heel muscle
chuck tender	2310	21	intercostals
blade	2300	21	rib blade meat
(a) oyster blade	2303	22	
(b) bolar blade	2302	22	standard beef muscle nam
(c) Shoulder Tender	2306	22	hindquarter primals
chuck	2260	23	forequarter primals
chuck roll	2275	23	beef skeletal diagram
chuck eye roll	2268	23	



For more information:

W: mla.com.au/msa E: msaenquiries@mla.com.au P: 1800 111 672

© Meat & Livestock Australia. All rights reserved. AUS-MEAT Limited: ausmeat.com.au Published: March 2021



Meat Standards Australia Beef Eating Quality Program

Meat Standards Australia (MSA) is a grading program designed to take the guess work out of buying and cooking Australian beef.

An important element contributing to eating quality is the on farm or feedlot management of cattle.

Animal management

For consistent eating quality, cattle need to be managed on a rising plane of nutrition to meet their energy demands for growth.

Cattle must also be handled in a manner that keeps stress to a minimum during mustering and transport. Stress is a major contributor to a condition that results in dark, tough beef.

Cattle eligibility

All cattle are sourced from registered MSA producers and consigned to the MSA licensed processing plant with both a Livestock Production Assurance (LPA) National Vendor Declaration (NVD) and an MSA vendor declaration.

The NVD contains information about the property, vendor, exposure of cattle to chemicals, and feeding history.

The NVD declares that the vendor has met the requirements of the LPA food safety scheme or National Feedlot Accreditation Scheme (NFAS), depending on which program they are involved in.

The MSA vendor declaration provides assurance that the producer has followed recommendations on farm to minimise stress and optimise the eating quality of the cattle.

Processing treatments

Cattle must be processed according to the MSA Standards and processors must implement on-site quality systems to optimise eating quality.

Integrity

All participants in the program are to certify products with the MSA trademark via an approved Quality Management System in accordance with the MSA Standards Manual. Licensees are subject to independent random audit programs for compliance to the Standards. MSA Standards are backed by independent audit to the AS/ NZS ISO 9001-2015 Standard.



Individual carcase attributes are collected by an MSA certified grader. The attributes are entered into the MSA grading model and an eating quality grade is calculated for individual carcase cuts according to cooking method.

MSA marbling

Marbling is assessed at the M.longissimus dorsi at the ribbing site of the carcase. It is calculated by evaluating the amount and distribution of marbling in comparison to the MSA Standards. Scores range from 100 to 1190.

Key point:

• Eating quality increases as marbling increases.



Maturity (or ossification)

This is the assessment of the physiological age of an animal. The term 'ossification' refers to cartilage turning to bone in the vertebrae. It is measured in three

sections along the backbone; sacral (tail), lumbar (loin) and thoracic (head). Scores range from 100 to 590.

Key points:

- 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 height has a negative impact on the eating quality of many cuts. Hump height is measured in increments of 5mm.





Ultimate pH

Ultimate pH is one of the most significant indicators of eating quality. It involves measurement of lactic acid within the muscle, taken from a pH probe. The optimum pH level of meat is below 5.71. Carcases with pH above 5.70 are ineligible for MSA certification.

Key points:

- Energy (glycogen) levels in the animal are important in obtaining a pH within the acceptable range.
- Excessive pre-slaughter stress can result in cattle losing energy and result in a high pH meat.





Meat colour

6

Meat colour is assessed at the rib eye muscle (m.longissimus dorsi). It is assessed on the chilled carcase and scored against the AUS-MEAT meat colour reference standards.



than 6 Chip

7

Meat colour is not an MSA minimum requirement.

Fat distribution

Even fat coverage enables uniform chilling rates throughout the carcase. Fat distribution involves the measurement in millimetres of subcutaneous fat at the ribbing site and must be 3mm or greater.

Fat must be evenly distributed over the loin, hind and forequarters.



Fat colour

Fat colour is the colour of the intermuscular fat lateral to the rib eye muscle. It is assessed on the chilled carcase and scored against the AUS-MEAT fat colour reference standards.

MSA minimum requirements

Carcases that fail to comply with MSA minimum requirements are not eligible to be identified and sold as MSA product.

Minimum requirements:

- Rib fat must be equal to or greater than 3mm
- Adequate fat distribution
- Ultimate pH must be below 5.71.

In addition to MSA minimum requirements, individual companies or brands may also have specifications to suit their market requirements and further differentiate their product.

For example, some brands may include fat and/or meat colour specifications for their product.



Colours displayed show the darkest colour of each grading and is a guide only, not a true representation.



MSA eating quality scores

The eating quality values for MSA product are determined by consumer sensory testing. Consumer feedback is given on a score of 0–100 based on the eating quality attributes tenderness, juiciness and flavour and overall acceptability of a sample of meat. These scores are then amalgamated to create an eating quality score out of 100 for each cut in the carcase. This feedback also determines the effect of production, carcase and processing inputs on eating quality.

The eating quality scores can then be related to three bands of eating quality, MSA 3, 4 and 5 star. The MSA star symbols provide an independent endorsement of eating quality. The MSA 4 and 5 star symbols are a way to identify the cuts that have achieved the pinnacle in excellence for Australian beef. Use of the MSA 4 and 5 star symbols is optional and supported through supply chains that produce and promote the appropriate cuts and eating quality level.





How to use this book





CUT H.A.M. CODE MUSCLE NUMBER (#) H.A.M. refers to the AUS-MEAT Handbook of Australian Meat cut code and cut item description. Muscle number refers to the numbers assigned to individual bovine muscles as per the H.A.M. (A) EYE OF RUMP HAM 2093 M 31 Image: HAM CODE Image: HAM CODE

COOKING METHOD

Cooking methods that can apply to this cut. Refer to the carton panel information to determine applicable cooking methods.

How to find MSA eating quality information

MSA eating quality information can be found on a carton panel. Look for an eating quality grade, recommended cooking ______ methods and days ageing requirements.



Cooking methods

It is important that we display product by the recommended cooking method, to remove the guesswork out of purchasing beef for consumers. All MSA graded product only eats as described if prepared by the correct cooking method.

The information below shows the cooking symbols, cooking methods and recommended preparation:



GRILL (GRL)

Steaks should be cut at a minimum thickness of 21mm and are suitable for cooking in a pan, grill or BBQ.



ROAST (RST)

Preheat oven to recommended temperature and roast according to table.

suggested cooking times for beef roasts/500g

	oven temp	rare	medium	well done
internal temperature		60°C	65°C-70°C	75°C
rib eye / scotch fillet, rump, sirloin, fillet, topside	200°C	15–20min	20–25min	25–30min
silverside, blade, round	160°C	20-25min	25–30min	30–35min

Once the roast has been removed from the oven allow to rest for 10 minutes.



STIR FRY (SFR)

Product is prepared into strips approximately 10mm in width and depth and 75mm in length. Beef strips are cooked quickly on a hot surface in small batches.



CASSEROLE (CASS)

The product is prepared in 20mm cubes. Cover in liquid and simmer on a low heat (160°C) for approximately 2 hours.



Product is prepared by cutting to 1.5–2mm thickness. A hot-pot cooking method, shabu shabu is prepared by submerging

meat or vegetables in a pot of

boiling water or broth.

YAKINIKU (YAK)

Product is prepared by cutting to 4mm thickness. A style of cooking small thinly sliced meat pieces and vegetables over a charcoal or gas burner.

THIN SLICE (TSL)

Product is prepared to 2mm thickness and suitable for dry cooking methods.



CORN (CRN)

Product is cured and prepared by a slow wet cook.



ROAST COMBI (RSC)

The roast is cooked in a Combi Oven set to 80°C in combination mode. Product is removed when internal temperature reaches 65°C.



ROAST THIN SLICE COLD (RC2)

The roast is chilled after cooking and sliced across the grain into 2mm slices.



ROAST SLICE COLD (RCT)

The roast is chilled after cooking and sliced across the grain into 10mm slices.



SOUS VIDE DICE (SVD)

Vacuum packed diced cubes 21mm x 21mm x 21mm are cooked for 3 hours at 62.5°C in a water bath with circulated water. After removal the cubes are drained and transferred to a mild stock as used in casserole.



8



10

Rump is prepared from a Hindquarter. The Rump is removed by a straight cut commencing at the subiliac lymph node to a point cranial to the acetabulum avoiding the quadriceps group of muscles of the Knuckle to the ischiatic lymph node. The Loin is removed by a cut separating the Rump and the Loin at the lumbar sacral junction.

The Rump is further prepared by the removal of all abdominal muscles from the Flank leaving the M. tensor fasciae latae (tail).





*MUSCLE A = B + C

CUT	HAM CODE	MUSCLE #
RUMP	HAM 2090	M 5, 30, 31, 32, 87
CUT	HAM CODE	MUSCLE #
(A) EYE OF RUMP	HAM 2093	M 31
(B) EYE RUMP CENTRE	HAM 2095	M 31
(C) EYE RUMP SIDE	HAM 2094	M 31
(D) RUMP CAP	HAM 2091	M 5
(E) RUMP FLAP	HAM 2096	M 30, 32
(F) TRI-TIP	HAM 2131	M 87







CUTTING INSTRUCTIONS

Eye of Rump is prepared from a Rump (item 2090) by removing the Eye portion (M. gluteus medius) from the primal. The eye of rump can also be known as Rostbiff.



CUTTING INSTRUCTIONS

Eye Rump Centre is prepared from an Eye of Rump (item 2093) by carefully separating the eye of rump muscle into two portions. A cut is made through a (false seam) formed by the silverskin through the centre of the muscle. The ventral portion of the muscle is the Eye Rump Centre.

12







(D) RUMP CAP HAM 2091 M 5 一 一 ご ご

CUTTING INSTRUCTIONS

Rump Cap is prepared from a Rump (item 2090) by separating and removing the Rump Cap (M. gluteo biceps) from the Rump.









CUTTING INSTRUCTIONS

Tri-tip is the portion of the (M. tensor fascia latae) triangle shape muscle remaining after preparation of a rump (item 2090).

Tenderloin 2150

14

Tenderloin is prepared from the hindquarter and is removed in one piece from the ventral surface of the lumbar vertebrae and the lateral surface of the ilium. The side strap muscle (m. psoas minor) remains attached. Silverskin is retained.



POINTS REQUIRING SPECIFICATION

• Silverskin removed. • Side strap muscle – (M. psoas major) retained or removed.



Butt Tenderloin is prepared from the Tenderloin by removing the tail of the Tenderloin at the lumbo sacral junction.



CUTTING INSTRUCTIONS

Tenderloin Butt Off is prepared from a Tenderloin by removing the Tenderloin Butt (item 2170) at the lumbo sacral junction.

Striploin 2140

Striploin is prepared from a hindquarter. Striploin consists of the (M. longissimus dorsi) muscle and associated fat cover and is removed from the lumbar sacral vertebrae and including the 10th to 13th ribs of the Forequarter. The Flank is removed by a straight cut at a specified distance from the eye of meat and parallel to the chine edge.



Short Ioin 1552

Short Loin is prepared from a Hindquarter by a straight cut at the junction of the lumbar and sacral vertebrae to a point cranial to the tuber coxae to the ventral portion of the Flank. The Thin Flank is removed at a point cranial to the tuber coxae and approximately 50mm from the M. longissimus dorsi (eye muscle), and running parallel to the body of the vertebrae to the specified rib.



Striploin – Larder Trim

Remove the side muscle (M. multifidis) along the natural seam. Remove fat and gristle (silverskin) to red meat from the dorsal edge of the Striploin at approximately 50mm in width for the length of the Striploin.





Knuckle 2070

16

Knuckle is prepared from a Hindquarter and is removed from the Butt following the natural seam between the topside and silverside. the patella joint capsule is removed. The cap muscle (tensor fasciae latae) and associated fat and subiliac lymph node is removed.





CUT	HAM CODE	MUSCLE #
KNUCKLE	HAM 2070	M 66, 98, 99, 100
$\dot{\mathbf{U}}$	-T,	
CUT	HAM CODE	MUSCLE #
CUT (A) EYE OF KNUCKLE	HAM CODE HAM 2067	MUSCLE # M 66
CUT (A) EYE OF KNUCKLE (B) KNUCKLE UNDERCUT	HAM CODE HAM 2067 HAM 2069	MUSCLE # M 66 M 98, 100

Knuckle 2070





CUTTING INSTRUCTIONS

Knuckle Undercut is prepared from a Knuckle (item 2070) by removing the two muscles (M. vastus medialis and M. vastus intermedius) in one piece, from the primal.



CUTTING INSTRUCTIONS

Eye of Knuckle is prepared from a Knuckle (item 2070) by removing the eye portion (M. rectus femoris) from the primal.



CUTTING INSTRUCTIONS

Knuckle Cover is prepared from a Knuckle (item 2070) by removing the (M. vastus lateralis) from the primal.

17

Topside 2000

18

Topside is prepared from a Hindquarter. The Topside is removed by following the natural seam between the Thick Flank and Silverside. Fibrous tissue, gland and associated fats are removed.



CUT	HAM CODE	MUSCLE #
TOPSIDE	HAM 2000	M 1, 33, 55, 70, 73
	LL	

CUT	HAM CODE	MUSCLE #
(A) TOPSIDE CAP OFF	HAM 2001	M 1, 55, 70, 73
(B) EYE OF TOPSIDE	HAM 2013	M 1
(C) TOPSIDE CAP	HAM 2012	M 33



CUTTING INSTRUCTIONS

Topside Cap Off is prepared from a Topside (item 2000) by removing the cap (M. gracillis) along the natural seam.



CUTTING INSTRUCTIONS

Eye of Topside is prepared from a Topside Cap Off (item 2001) and is the portion (M. abductor) muscle remaining.



CUTTING INSTRUCTIONS

Topside Cap is the (M. gracillis) muscle removed from the Topside along the natural seam.

19



Outside Flat is prepared from outside by the removal of the Eye Round along the natural seam between the Outside Flat (M. gluteobiceps) and the Eye Round (M. semitendinosus).

I TING INSTRUCTIONS

Eye Round is prepared from an Outside by following the natural seam between the Outside Flat (M. gluteobiceps) and the Eye Round (M. semitendinosus).

Cube Roll 2244

20

Cube Roll consists of the muscle (M. longissimus dorsi) lying on the dorsal aspect of the ribs. Cube Roll length is measured by the number of ribs required from the 4th rib to the 13th rib inclusive.



CUT	HAM CODE	MUSCLE #
CUBE ROLL	HAM 2244	M 45, 81, 49
	5	

CUT	HAM CODE	MUSCLE #
(A) RIB EYE MUSCLE	HAM 2245	M 45
(B) CUBE ROLL PLATE	HAM 2229	M 81



CUTTING INSTRUCTIONS

Rib Eye Muscle is prepared from a Cube Roll (item 2244) and consists of the muscle lying on the edge of the ribs. The Rib Eye Muscle consists solely of the (M. longissimus dorsi) from the 4th to the 13th rib inclusive.



CUTTING INSTRUCTIONS

Cube Roll Plate is prepared from a Cube Roll (item 2244) (M. spinalis dorsi). The attached muscle (M. multifidis) is removed.

Blade 2300

Blade is prepared from a Forequarter. The Blade is removed by following the natural seam between the ribs and the scapular. The Blade consists of a large portion of the triceps group of muscles.



CUT	HAM CODE	MUSCLE #
(A) OYSTER BLADE	HAM 2303	M 36
(B) BOLAR BLADE	HAM 2302	M 95, 96, 97



CUTTING INSTRUCTIONS

Chuck Tender is a round conical shape muscle lying lateral to the blade bone on the cranial side of the blade ridge. the fat cover is removed. 22





CUTTING INSTRUCTIONS

Oyster Blade is prepared from a Blade by the removal of the Bolar Blade (triceps group) from the Oyster (M. infraspinatus).



CUTTING INSTRUCTIONS

Bolar Blade is prepared from a Blade by the removal of the (M. infraspinatus). lying caudal to the humerus, includes a large portion of the triceps group of muscles.



CUTTING INSTRUCTIONS

Shoulder Tender is the M. teres major prepared from a Blade. All heavy surface fat is removed and the muscle portion is trimmed to specification.

Chuck 2260

Chuck is prepared from a forequarter by the removal of the rib set at the specified rib. The shin, brisket, blade, chuck, tender, bones, cartilage, ligamentum nuchae (paddywhack) and lymph nodes are removed. The (M. subscapularis) is left attached.



CUT	HAM CODE	MUSCLE #
СНИСК	HAM 2260	-
ひした		

CUT	HAM CODE	MUSCLE #
(A) CHUCK CREST	HAM 2278	M 68
(B) CHUCK ROLL PLATE	HAM 2288	M 81
(C) CHUCK PIECES	HAM 2267	M 81, 68, 74
(D) CHUCK RIB	HAM 2279	M 78



CUTTING INSTRUCTIONS

Chuck Roll is prepared from a Chuck (item 2260) by the removal of a portion of the neck between the 5th and 6th cervical vertebrae parallel to the caudal cutting line. The tail is approximately 75mm from the eye muscle and the dorsal edge is cut in a straight line. The (M. trapesius and M. rhomoideus) are removed and the (M. subscapularis) undercut remains firmly attached.



CUTTING INSTRUCTIONS

Chuck Eye Roll is prepared from the Chuck Roll (item 2275) by the removal of a portion of the (M.serratus ventralis).

Chuck 2260

24





CUTTING INSTRUCTIONS

Chuck Crest is prepared from the Chuck and is the portion of the (M. rhomoideus) muscle on the dorsal edge.



CUTTING INSTRUCTIONS

Chuck Pieces are prepared from a Chuck and can comprise of recognised primal cuts, specified sub primal cuts or individual muscles. specific muscles include (M. spinalis dorsi, M. rhomboideus, and M. semispinalis capitis).



CUTTING INSTRUCTIONS

Chuck Rib Side is prepared by removing a portion of the M. serretus ventralis cervicus, which lies over the neck.



25



Flank of the Hindquarter by the removal of

deposits are removed.

the (M. obliquus externus abdominus). All fat

Flank of the Hindquarter and is the thickest

All fat deposits are removed.

portion of the (M. obliquus internus abdomininus).

Flank Steak is prepared from the thin Flank of the Hindquarter and is the flat lean fleshy portion of the (M. rectus abdominis). The serous membrane is removed.



CUTTING INSTRUCTIONS

Shin is prepared from a Hindquarter and Forequarter and consists of the flexor and extensor group of muscles. The skin is peeled from the meat surface.



CUTTING INSTRUCTIONS

Heel Muscle is prepared from the Outside and consists of the (M. gastrocnemuisis) muscle removed along the natural seam.



CUTTING INSTRUCTIONS

Intercostals are derived from the full rib cage and are the muscles lying between the ribs.



Rib Blade Meat is derived from the Rib Meat and comprises of a portion of the Rib Cap (M. latissimus dorsi) and trimmed into a rectangular shape. All visible fat is removed.

27

28

1 2

3

4

5

6 7

8

9

10

11

12 13

14

15

16

17 18

19

20

21

22

23 24

25

26

27

28 29

30

31

32 33

34

35

36

Standard beef muscle names

M. adductor femoris	40	M. ischiocav
M. anconaeus	41	M. latissimus
M. articularis genu	42	M. levatores
M. biceps brachii	43	M. longissim
M. biceps femoris (syn. gluteobiceps)	44	M. longissim
M. brachialis	45	M. longissim
M. brachiocephalicus		thoracis et lu
M. coracobrachialis	46	M. longus ca
M. cutaneus omobrachialis	47	M. longus co
M. cutaneus trunci	48	M. multifidi c
M. deltoideus	49	M. multifidi d
M. diaphragma	50	M. obliquus
M. extensor carpi obliquus	51	M. obliquus
M. extensor carpi radialis	52	M. obliquus
M. extensor carpi ulnaris	53	M. obturator
M. extensor digiti quarti proprius	54	M. omotrans
M. extensor digiti quarti proprius (pedis)	55	M. pectineus
M. extensor digiti tertii proprius	56	M. pectoralis
M. extensor digiti tertii proprius (pedis)	57	M. pectoralis
M. extensor digitorum communis	58	M. peronaeu
M. extensor digitorum longus	59	M. peronaeu
M. flexor carpi radialis	60	M. popliteus
M. flexor carpi ulnaris	61	M. protracto
M. flexor digitorum longus	62	M. psoas ma
M. flexor digitorum profundus	63	M. psoas mir
M. flexor digitorum profundus	64	M. rectus ab
M. flexor digitorum sublimis	65	M. rectus ca
M. flexor hallucis longus	66	M. rectus fer
M. gastrocnemius	67	M. rectus the
M. gluteus accessorius	68	M. rhomboid
M. gluteus medius	69	M. sacrococ
M. gluteus profundus	70	M. sartorius
M. gracilis	71	M. scalenus
M. iliacus	72	M. scalenus
M. iliocostalis	73	M. semimem
M. infraspinatus	74	M. semispina

77

- 37 M. intercostales externus and internus
- 38 M. intertransversarii cervicis
- 39 M. intertransversarius longus

40	M. ischiocavernosus
41	M. latissimus dorsi
42	M. levatores costarum
43	M. longissimus cervicis
44	M. longissimus capitis et atlantis
45	M. longissimus dorsi (syn. M. longissimus
	thoracis et lumborum)
46	M. longus capitis
47	M. longus colli
48	M. multifidi cervicis
49	M. multifidi dorsi
50	M. obliquus capitus caudalis
51	M. obliquus externus abdominis
52	M. obliquus internus abdominis
53	M. obturator externus and internus
54	M. omotransversarius
55	M. pectineus
56	M. pectoralis profundus
57	M. pectoralis superficialis
58	M. peronaeus longus
59	M. peronaeus tertius
60	M. popliteus
61	M. protractor praeputii
62	M. psoas major
63	M. psoas minor
64	M. rectus abdominis
65	M. rectus capitis dorsalis major
66	M. rectus femoris
67	M. rectus thoracis
68	M. rhomboideus
69	M. sacrococcygeus dorsalis et lateralis
70	M. sartorius
71	M. scalenus dorsalis
72	M. scalenus ventralis
73	M. semimembranosus
74	M. semispinalis capitis
75	M. semitendinosus
76	M. serratus dorsalis caudalis

M. serratus dorsalis cranialis

- 78 M. serratus ventralis cervicis
- 79 M. serratus ventralis thoracis
- 80 M. soleus
- 81 M. spinalis dorsi
- 82 M. splenius
- 83 M. sternocephalicus
- 84 M. subscapularis
- 85 M. supraspinatus
- 86 M. tensor fasciae antibrachii
- 87 M. tensor fasciae latae
- 88 M. teres major
- 89 M. teres minor
- 90 M. tibialis anterior
- 91 M. tibialis posterior
- 92 M. transversus abdominis
- 93 M. trapezius cervicalis
- 94 M. trapezius thoracis
- 95 M. triceps brachii caput laterale
- 96 M. triceps brachii caput longum
- 97 M. triceps brachii caput mediale
- 98 M. vastus intermedius
- 99 M. vastus lateralis
- 100 M. vastus medialis

Other structures

- 101 atlantal lymph node
- 102 ischiatic lymph node
- 103 ligamentum nuchae
- 104 periosteum
- 105 prescapular lymph node
- 106 scapula
- 107 scapula cartilage
- 108 subiliac lymph node

29

Hindquarter Primals



LIST OF MUSCLES

- 5 M. biceps femoris (syn. M. gluteobiceps)
- 10 M. cutaneus trunci
- 30 M. gluteus accessorius
- 31 M. gluteus medius
- 32 M. gluteus profundus
- 51 M. obliquus externus abdominis
- 52 M. obliquus internus abdominis

- 69 M. sacrococcygeus dorsalis et lateralis
- 87 M. tensor fasciae latae
- 92 M. transversus abdominis

Other structures

- *102 ischiatic lymph node
- *108 subiliac lymph node

LIST OF MUSCLES

ranial 🕂

Proximal

4

Cauda

- 5 M. biceps femoris (syn. M. gluteobiceps)
- 27 M. flexor digitorum sublimis (syn. M. flexor digitorum superficialis)
- 29 M. gastrocnemius
- 75 M. semitendinosus
- 80 M. soleus

Hindquarter Primals



M. vastus intermedius



30

LIST OF MUSCLES

- 66 M. rectus femoris
- 87 M. tensor fasciae latae
- 99 M. vastus lateralis 100 M. vastus medialis
- Other Structures

*104 periosteum



LIST OF MUSCLES

- 10 M. cutaneus trunci
- 37 M. intercostales externus et internus
- 51 M. obliguus externus abdominis
- 52 M. obliquus internus abdominis
- 64 M. rectus abdominis
- 92 M. transversus abdominis



98





LIST OF MUSCLES

M. iliacus

M. psoas major

63 M. psoas minor

31

Hindquarter Primals



LIST OF MUSCLES

- 1 M. = femoris
- 33 M. gracilis
- 40 M. ischiocavernosus
- 53 M. obturator externus et internus
- 55 M. pectineus
- 70 M. sartorius
- 73 M. semimembranosus





LIST OF MUSCLES



- M. cutaneus trunci
 M. gluteus medius
- 35 M. iliocostalis (syn. M. longissimus costarum)
- 37 M. intercostales externus and internus
- 45 M. longissimus dorsi (syn. M. longissimus thoracis et lumborum)
- 49 M. multifidi dorsi
- 51 M. obliquus externus abdominis
- 76 M. serratus dorsalis caudalis
- 81 M. spinalis dorsi
- 94 M. trapezius thoracis

Forequarter Primals

32



LIST OF MUSCLES

- 6[#] M. brachialis
- 7[#] M. brachiocephalicus
- 10 M. cutaneus trunci
- 35 M. iliocostalis (syn. longissimus costarum)
- 37 M. intercostales externus et internus
- 38[#] M. intertransversarii cervicis
- 39[#] M. intertransversarius longus
- 43 M. longissimus cervicis
- 44[#] M. longissimus capitis et atlantis
- 45 M. longissimus dorsi (syn. M. longissimus thoracis et lumborum)
- 46[#] M. longus capitis
- 47[#] M. longus colli
- 48[#] M. multifidi cervicis
- 49 M. multifidi dorsi
- 50 M. obliquus capitus caudalis
- 54 M. omotransversarius
- 56 M. pectoralis profundus (syn. M. pectoralis ascendens)

- 57 M. pectoralis superficialis (syn. M. pectoralis descendens et transversus)
- 65[#] M. rectus capitis dorsalis major
- 67 M. rectus thoracis
- 68 M. rhomboideus
- 71[#] M. scalenus dorsalis
- 72[#] M. scalenus ventralis
- 74 M. semispinalis capitis (syn. M. complexus)
- 77 M. serratus dorsalis cranialis
- 79 M. serratus ventralis thoracis
- 81 M. spinalis dorsi
- 82[#] M. splenius
- 83[#] M. sternocephalicus
- 84 M. subscapularis
- 93 M. trapezius cervicalis

Other structures

*103 ligamentum nuchae

[#] Muscles of the Chuck not shown in illustrations



LIST OF MUSCLES

- 10 M. cutaneus trunci
- 12 M. diaphragma
- 37 M. intercostales externus and internus
- 51 M. obliquus externus abdominis
- 56 M. pectoralis profundus (syn. M. pectoralis ascendens)
- 57 M. pectoralis superficialis (syn. M. descendens et transversus)
- 61 M. protractor praeputii
- 64 M. rectus abdominis
- 67 M. rectus thoracis
- 78 M. serratus ventralis cervicis
- 79 M. serratus ventralis thoracis
- 92 M. transversus abdominis

Forequarter Primals





LIST OF MUSCLES

- 10 M. cutaneus trunci
- 35 M. iliocostalis (syn. M. longissimus costarum)
- 36 M. infraspinatus
- 37 M. intercostales externus et internus
- 41 M. latissimus dorsi
- 42 M. levatores costarum
- 45 M. longissimus dorsi (syn. M. longissimus thoracis et lumborum)
- 49 M. multifidi dorsi
- 68 M. rhomboideus

- 74 M. semispinalis capitis (syn. M. complexus)
- 76 M. serratus dorsalis caudalis
- 77 M. serratus dorsalis cranialis
- 79 M. serratus ventralis thoracis
- 81 M. spinalis dorsi
- 84 M. subscapularis
- 94 M. trapezius thoracis

Other structures

- *103 ligamentum nuchae
- *104 scapula cartilage

- **Chuck Tender** 2310 107 Dorsa Cranial 🗲 Ventra 85 *106 **Blade 2300** FAT Proximal audal 🕀 Dieta 11 97 LIST OF MUSCLES 2 14 M. anconaeus 2
 - 88 M. teres major

M. brachialis

M. deltoideus

M. infraspinatus

M. latissimus dorsi

M. subscapularis

M. supraspinatus

M. coracobrachialis

M. extensor carpi radialis

M. tensor fasciae antibrachii

6

8

11

14

36

41

84

85

86

- 89 M. teres minor
- 95 M. triceps brachii caput laterale

36

- 96 M. triceps brachii caput longum
- 97 M. triceps brachii caput mediale

Other structures

- *106 scapula
- *107 scapula cartilage

Forequarter Primals

34





LIST OF MUSCLES

- 4 M. biceps brachii
- 6 M. brachialis
- 13 M. extensor carpi obliquus (syn. M. abductor pollicus longus)
- 14 M. extensor carpi radialis
- 15 M. extensor carpi ulnaris (syn. M. ulnaris lateralis)
- 16 M. extensor digiti quartii proprius (syn. M. extensor digitorum lateralis)
- 18 M. extensor digiti tertii proprius
- 20 M. extensor digitorum communis

15 18 20 (a) 20 (b) 20 (b)

- (a) humeral head
- (b) ulnar head
- 22 M. flexor carpi radialis
- 23 M. flexor carpi ulnaris
- M. flexor digitorum profundus(a) humeral head(b) ulna head
- M. flexor digitorum sublimis (syn. M. flexor digitorum superficialis)
 M. triceps brachii caput laterale
- (not shown)
- 96 M. triceps branchii caput longum

Shin-Shank (Hindquarter) 2360



LIST OF MUSCLES

- 17 M. extensor digiti quarti proprius (pedis) (syn. M. extensor digitorum lateralis)
- M. extensor digiti tertii proprius (pedis) (syn. M. extensor digitorum longus of the extensor group)
- 21 M. extensor digitorum longus (of the extensor group)
- 24 M. flexor digitorum longus (of the flexor digitorum profundus (pedis))
- 26 M. flexor digitorum profundus (pedis) consisting of:

(a) M. tibialis posterior (91)

- (b) M. flexor hallicus longus (28) and
- (c) M. flexor digitorum longus (24)
- 28 M. flexor hallicus longus (of M. flexor digitorum profundus (pedis))
- 58 M. peronaeus longus59 M. peronaeus tertius
- (of the extensor group)
- 60 M. popliteus
- 90 M. tibialis anterior
- 91 M. tibialis posterior

Beef Skeletal Diagram

Forequarter







Locked Bag 991 North Sydney NSW 2060 Australia mla.com.au

MSA Contact Details PO BOX 2363 Fortitude Valley BC, QLD 4006 Australia tel 1800 111 672 fax 1800 999 672 mla.com.au/msa

MSA, Meat Standards Australia and the Rosette Device are registered trademarks of Meat and Livestock Australia Limited. This publication is published by Meat and Livestock Australia Limited ABN 39 081 678 364 (MLA). Care is taken to ensure the accuracy of information in the publication, however, MLA cannot accept responsibility for the accuracy of completeness of the information or opinions contained in the publication. Readers should make their own enquiries in making decisions concerning their interests.