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CANADA PORK INTERNATIONAL
CANADA PORC INTERNATIONAL

Canadian Centre for Swine Improvement Inc.
Centre Canadien pour l'Amélioration des Porcs Inc.
CCSI CCAP

Agriculture and Agri-Food Canada
Agriculture et Agroalimentaire Canada

List of factsheets (*Last Updated 2012-12-12)*

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Carcass quality					
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CMQS-102	Cold Half-Carcass Weight		✓	✓	2012-12-12
CMQS-103	Carcass Length		✓	✓	2012-12-12
	Primal Cuts				
CMQS-104	Weight of Primal Shoulder		✓	✓	2012-12-12
CMQS-105	Weight of Primal Ham		✓	✓	2012-12-12
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Loin Quality					
	Loin Marbling				
CMQS-201	Loin Marbling Score - Canadian Standard	✓			2012-12-12
CMQS-202	Loin Marbling Score - AAFC Standard	✓			2012-12-12
CMQS-203	Loin Marbling Score - NPPC Standard	✓			2012-12-12
CMQS-204	Loin Intramuscular Fat – chemical		✓	✓	2012-12-12

CMQS-205	Loin Intramuscular Fat – near infra red		✓		*2012-12-12*
	Loin Lean Colour				
CMQS-206	Loin Colour Score (Canadian Standard)	✓			
CMQS-207	Loin Colour Score (AAFC Standard)	✓			*2012-12-12*
CMQS-208	Loin Colour Score (NPPC Standard)	✓			*2012-12-12*
CMQS-209	Loin Colour Score (Japanese Standard)	✓			*2012-12-12*
CMQS-210	Loin Minolta Color		✓	✓	*2012-12-12*
	Loin Texture				
CMQS-211	Loin Structure Score (AAFC Standard)	✓			*2012-12-12*
CMQS-212	Loin Firmness Score (NPPC Standard)	✓			*2012-12-12*
CMQS-213	Loin Firmness (Durometer)		✓		*2012-12-12*
	Loin Drip and Cooking Loss				
CMQS-214	Loin Drip Loss – Bag method		✓	✓	*2012-12-12*
CMQS-215	Loin Drip Loss – Tray method		✓		*2012-12-12*
CMQS-216	Loin Drip Loss – EZ drip method		✓		*2012-12-12*
CMQS-217	Loin Cooking Loss		✓	✓	*2012-12-12*
	Loin Fat Colour				
CMQS-218	Fat Colour Score (Canadian Standard)	✓			*2012-12-12*
CMQS-219	Fat Colour Score (Japanese Standard)	✓			*2012-12-12*
CMQS-220	Fat Minolta Colour		✓	✓	*2012-12-12*
	Loin Fat Firmness				
CMQS-221	Fat Firmness Score	✓			*2012-12-12*
CMQS-222	Fat Firmness (Durometer)		✓		*2012-12-12*
	Loin - others				
CMQS-223	Loin 24h pH		✓	✓	*2012-12-12*
CMQS-224	Loin conductivity		✓		*2012-12-12*
	Ham Quality				
CMQS-301	Ham 24h pH		✓	✓	*2012-12-12*
CMQS-302	Ham Minolta Color		✓	✓	*2012-12-12*
CMQS-303	Ham Drip Loss – Bag method		✓	✓	*2012-12-12*
CMQS-304	Ham Drip Loss – Tray method		✓		*2012-12-12*
CMQS-305	Ham Drip Loss – EZ drip method		✓		*2012-12-12*

Belly Quality					
CMQS-401	Belly Firmness (Flop Test)		✓		*2012-12-12*
CMQS-402	Belly Firmness (Durometer)		✓		*2012-12-12*
CMQS-403	Belly Conductivity		✓		*2012-12-12*

Factsheet # CMQS-101

Hot Carcass Weight

Updated 2012-12-12

Parameters	Description
Name	Hot Carcass Weight
Units	Kilograms (kg), to the tenth of kg
Category	Objective
Range	50-120 kg
Site	NA
Measurement Time	Between evisceration and chilling
Blooming	NA
Temperature	NA
Cautions	In many plants, hogs reach the weigh scale without their kidneys so a standard substitute kidney weight is added to the actual weight at the scale (ie 300 grams).
Material	Scale
Methodology	To be measured as the dressed (eviscerated) hot weight of the carcass, including the head (with tongue), leaf lard, kidneys, tenderloins, tail, backbone and front and hind feet.
Pictures	
References	Agriculture and Marketing Act, Hog Carcass Grading Regulations

Factsheet # CMQS-102

Cold Half-Carcass Weight

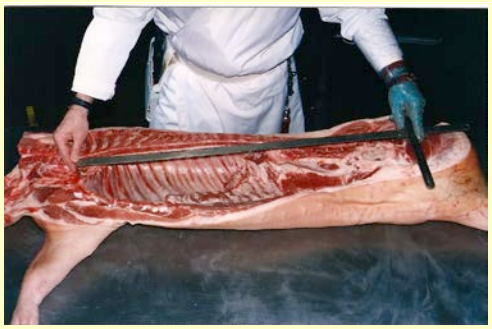
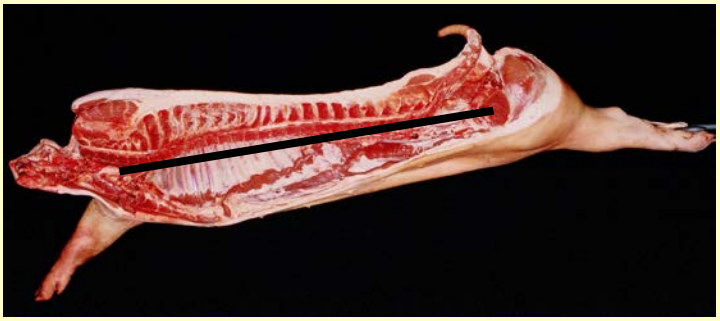
Updated 2012-12-12

Parameters	Description
Name	Cold Half-Carcass Weight
Units	Kilograms (kg), to the tenth of kg
Category	Objective - Reference
Range	20-55 kg
Site	NA
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10° C
Cautions	
Material	Calibrated scale
Methodology	To be measured as the cold weight of one side, preferably left, not including the head, kidneys or leaf lard, but including front and hind feet.
Pictures	  
References	

Factsheet # CMQS-103

Carcass Length

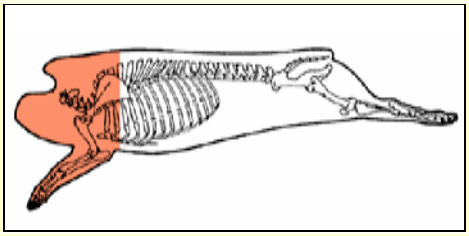
Updated 2012-12-12

Parameters	Description
Name	Carcass Length
Units	Centimeters (cm)
Category	Objective
Range	60-110 cm
Site	NA
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C
Cautions	Measured on a half-carcass preferably set horizontally on a table
Material	Foster Gauge Ruler or measuring tape
Methodology	Measured on the cold carcass, from the cranium edge of the first rib to the anterior tip of the aitchbone.
Pictures	 
References	

Factsheet # CMQS-104

Weight of Primal Shoulder

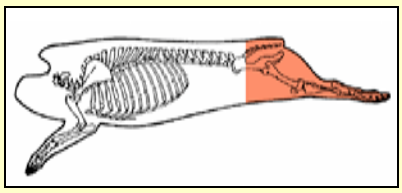
Updated 2012-12-12

Parameters	Description
Name	Weight of Primal Shoulder
Units	Kilograms, to the tenth of kg
Category	Objective – Reference
Range	6-15 kg
Site	
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C
Cautions	
Material	Saw, scale, knife
Methodology	To be measured as a primal-cut shoulder (bone in, skin and fat on). The shoulder complex (blade, picnic) is removed from the side with a perpendicular cut to the main axis between the 2nd and 3rd thoracic vertebrae (ribs). The foot is removed by a cut through the wrist (carpal) joint. Jowl is removed by a straight cut parallel to rib side, leaving the half moon muscle on the shoulder.
Pictures	
References	Canadian Pork Handbook, Canada Pork International, 2011

Factsheet # CMQS-105

Weight of Primal Ham

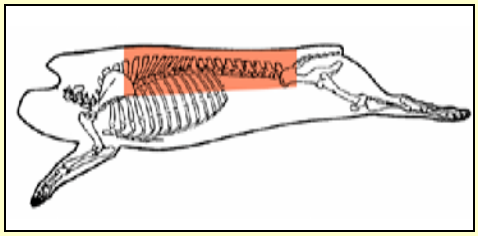
Updated 2012-12-12

Parameters	Description
Name	Weight of Primal Ham
Units	Kilograms (kg) to the tenth of kg
Category	Objective – Reference
Range	6-15 kg
Site	
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C
Cautions	
Material	Saw, knife, scale
Methodology	To be measured as a primal-cut ham (bone in, skin and fat on). Ham is removed from the side by making a straight cut perpendicular to outer skin surface at a point 50-60 mm anterior to the aitch bone, just missing the juncture of the tail bone and aitch bone tip (approx 3-6 mm). The hind foot is removed by making a straight cut through the hock joint to expose the heel bone. Tail is removed from the underside of the tailbone leaving a clean cut surface.
Pictures	
References	Canadian Pork Handbook, Canada Pork International, 2011

Factsheet # CMQS-106

Weight of Primal Loin

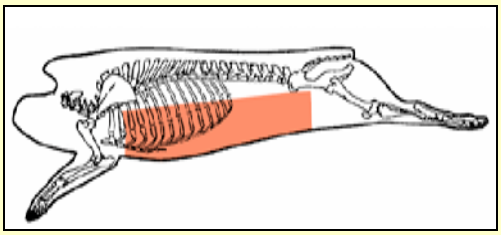
Updated 2012-12-12

Parameters	Description
Name	Weight of Primal Loin
Units	Kilograms (kg), to the tenth of kg
Category	Objective – Reference
Range	6-15 kg
Site	
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C
Cautions	
Material	Saw and scale
Methodology	To be measured as a primal-cut loin (bone-in, skin and fat on). Loin is cut from a point on the rib perpendicularly down from the ventral side of the thoracic vertebrae, where the shoulder was removed, to a point about 25 mm from the tenderloin at the leg (ham end). Cut from the belly with a straight cut which extends from a point which is ventral to the *Longissimus* on the shoulder end, to a point on the leg end ventral to but not more than 13 mm from the tenderloin. The scribe (maximum rib measurement from backbone) should not exceed 12 cm.
Pictures	
References	Canadian Pork Handbook, Canada Pork International, 2011

Factsheet # CMQS-107

Weight of Primal Belly

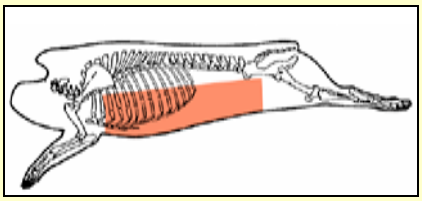
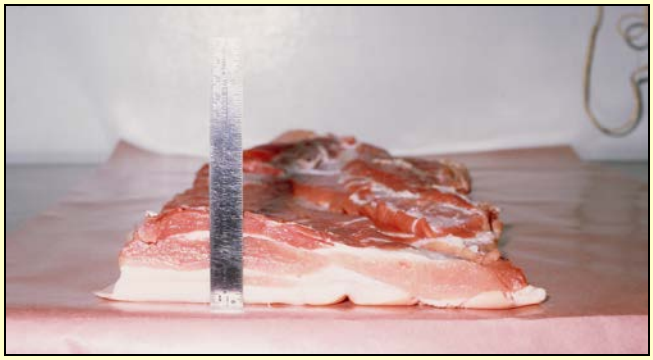
Updated 2012-12-12

Parameters	Description
Name	Weight of Primal Belly
Units	Kilograms (kg), to the tenth of kg
Category	Objective - Reference
Range	4-12 kg
Site	
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C
Cautions	
Material	Saw, scale
Methodology	To be measured as a primal-cut belly (bone in, skin and fat on). The belly is the portion of the side remaining after removal of leg, shoulder, loin and side ribs. The anterior (shoulder) and posterior (leg) ends of the belly should be reasonably straight and parallel.
Pictures	
References	Canadian Pork Handbook, Canada Pork International, 2011

Factsheet # CMQS-108

Maximum Belly Thickness

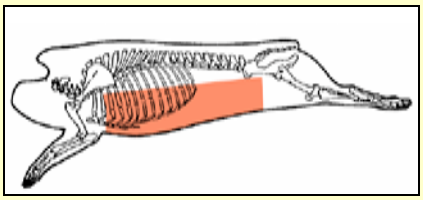
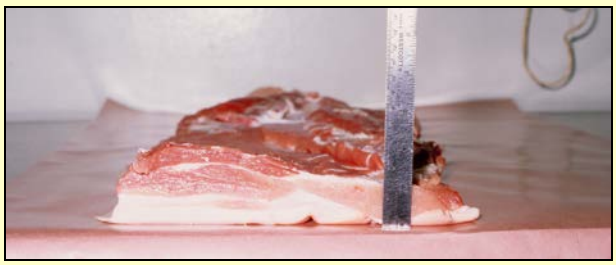
Updated 2012-12-12

Parameters	Description
Name	Maximum Belly Thickness
Units	Millimeters (mm)
Category	Objective - Reference
Range	
Site	Between 3rd and 4th last ribs 
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C
Cautions	
Material	Ruler or caliper or camera
Methodology	To be measured at least 24 hours after slaughter as the maximum thickness of the cross-section of the square-cut, skin-on belly. The measurement is taken at the 3/4 last rib, with a caliper, or on a cross-section of the belly, either directly with a ruler or from a digital image using computer software.
Pictures	
References	Fredeen HT, 1980. Yields and Dimensions of Pork Bellies in Relation to Carcass Measurements, J. Anim. Sci., 51:59-68.

Factsheet # CMQS-109

Minimum Belly Thickness

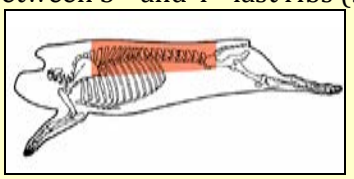
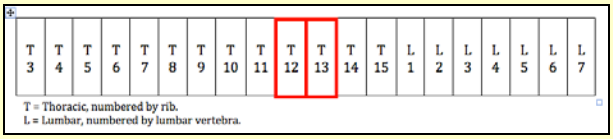
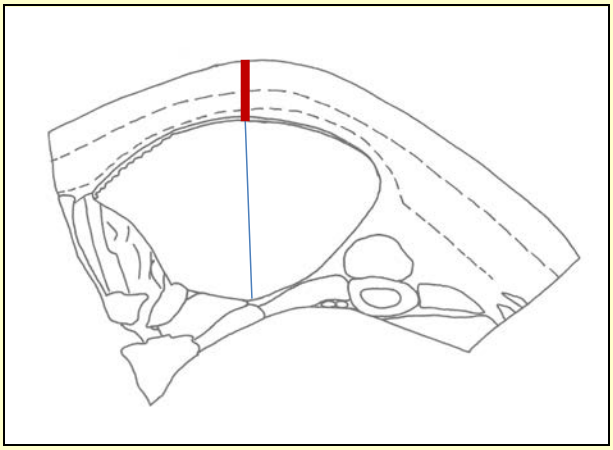
Updated 2012-12-12

Parameters	Description
Name	Minimum Belly Thickness
Units	Millimeters (mm)
Category	Objective - Reference
Range	
Site	Between 3rd and 4th last ribs 
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C
Cautions	
Material	Ruler or caliper or camera
Methodology	To be measured at least 24 hours post-mortem as the minimum thickness of the cross-section of the square-cut, skin-on belly. The measurement is taken at the 3/4 last rib with a caliper, or on a cross-section of the belly, either with a ruler or from a digital image using computer software.
Pictures	
References	Fredeen HT, 1980. Yields and Dimensions of Pork Bellies in Relation to Carcass Measurements, J. Anim. Sci., 51:59-68.

Factsheet # CMQS-110

Backfat Thickness - ruler

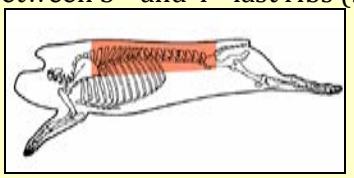
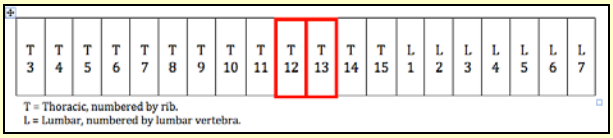
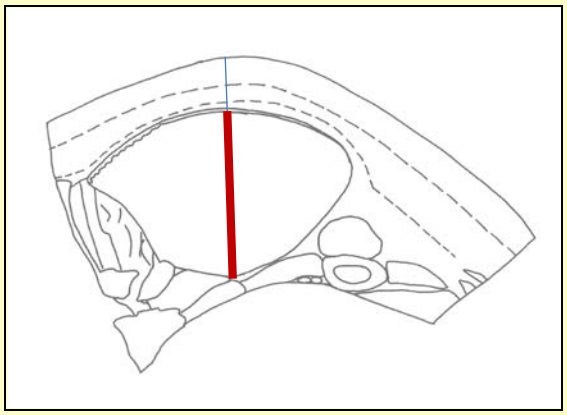
Updated 2012-12-12

Parameters	Description
Name	Backfat Thickness - ruler
Units	Millimeters (mm)
Category	Objective – Reference
Range	5-50 mm
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	<10°C
Cautions	
Material	Ruler or scanner/camera
Methodology	To be measured on the left side of a cold, ribbed carcass or left loin at the 3rd/4th last rib interface, perpendicular to and at the middle of a line bisecting the loin eye along its longest axis, by ruler or digital camera or scanner image with appropriate computer software. If a third layer of fat is present, include it in the measure.
Pictures	
References	

Factsheet # CMQS-111

Lean Depth - ruler

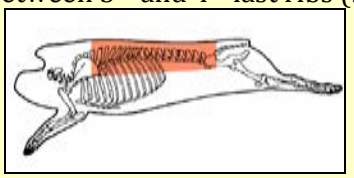
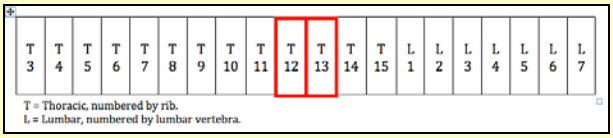
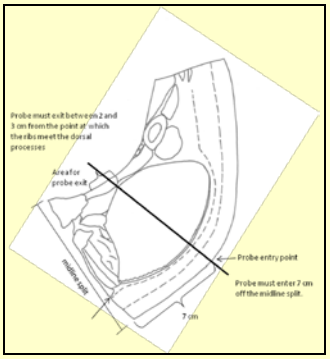
Updated 2012-12-12

Parameters	Description
Name	Lean Depth - ruler
Units	Millimeters (mm)
Category	Objective - Reference
Range	30- 100 mm
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C
Cautions	
Material	Ruler or scanner/camera
Methodology	To be measured on the left side of a cold, ribbed carcass or left loin at the 3rd/4th last rib interface, perpendicular to and at the middle of a line bisecting the loin eye along its longest axis, by ruler, digital camera or scanner image with appropriate computer software
Pictures	
References	

Factsheet # CMQS-112

Backfat Thickness – fibre-optic probe

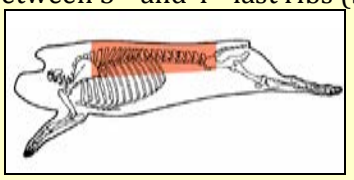
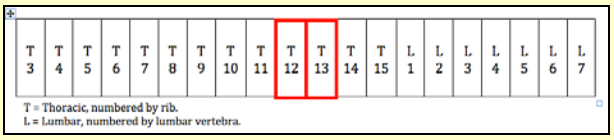
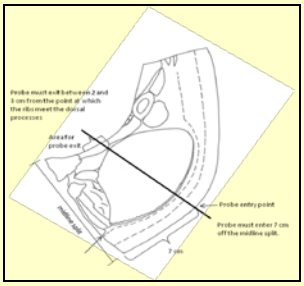
Updated 2012-12-12

Parameters	Description
Name	Backfat Thickness – fibre-optic probe
Units	Millimeters (mm)
Category	Objective
Range	5-50 mm
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	Between evisceration and chilling
Blooming	NA
Temperature	
Cautions	
Material	Destron or Hennessy probe
Methodology	Using a smooth probing motion, keeping the probe perpendicular to both the long axis of the carcass and the skin, enter the left carcass side between the third- and fourth-last ribs, 7 cm from the dorsal line. Emerge 2 cm from the junction of the backbone and the rib (see diagram) and continue until the probe stops moving. As the probe is pulled smoothly out of the carcass, the sensor at the tip records fat and lean thicknesses from reflectance differences. Prior to each use, check accuracy with the calibration block. After each use, check equipment for smooth movement, knife tip sharpness, and sensor condition
Pictures	 
References	1992 National Pork Carcass Cutout, Part 7. A.P. Schinckel, J. R. Wagner, J. C. Forrest and M. E. Einstein, J.Anim.Sci. 2010, 88:767-794. Fortin, A., A.K.W. Tong and W.M. Robertson. 2003. Advances in Pork Production (2003) Volume 14, Abstract #24. http://www.classement2000.com/services-en.php http://www.hennessy-technology.com/grading.html

Factsheet # CMQS-113

Lean Depth – fibre-optic probe

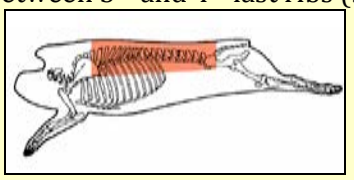
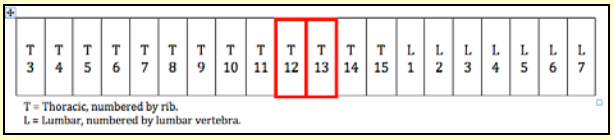
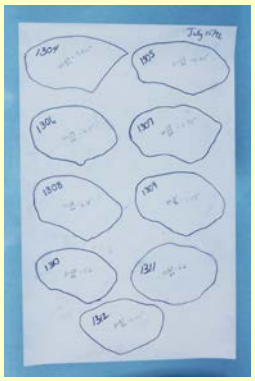
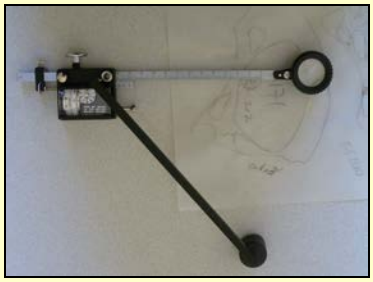
Updated 2012-12-12

Parameters	Description
Name	Lean Depth – fibre-optic probe
Units	Millimeters (mm)
Category	Objective
Range	30-90 mm
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	Between evisceration and chilling
Blooming	NA
Temperature	
Cautions	
Material	Destron or Hennessy probe
Methodology	Using a smooth probing motion, keeping the probe perpendicular to both the long axis of the carcass and the skin, enter the left carcass side between the third- and fourth-last ribs, 7 cm from the dorsal line. Emerge 2 cm from the junction of the backbone and the rib (see diagram) and continue until the probe stops moving. As the probe is pulled smoothly out of the carcass, the sensor at the tip records fat and lean thicknesses from reflectance differences. Prior to each use, check accuracy with the calibration block. After each use, check equipment for smooth movement, knife tip sharpness, and sensor condition
Pictures	 
References	1992 National Pork Carcass Cutout, Part 7. A.P. Schinckel, J. R. Wagner, J. C. Forrest and M. E. Einstein, J.Anim.Sci. 2010, 88:767-794. Fortin, A., A.K.W. Tong and W.M. Robertson. 2003. Advances in Pork Production (2003) Volume 14, Abstract #24. http://www.classement2000.com/services-en.php http://www.hennessy-technology.com/grading.html

Factsheet # CMQS-114

Loin Eye Area - Planimeter

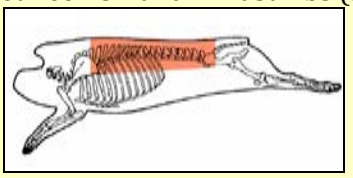
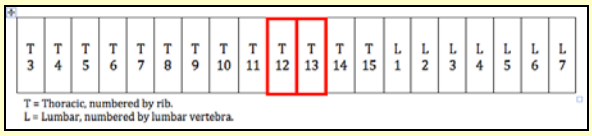
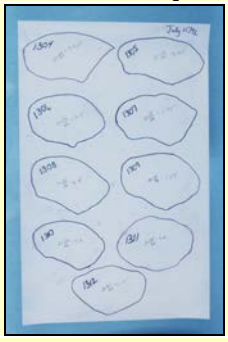
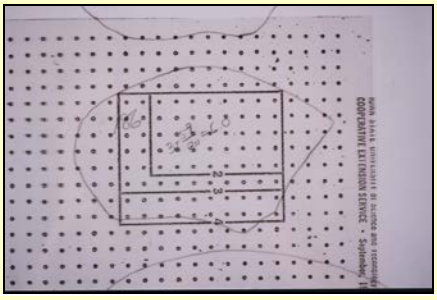
Updated 2012-12-12

Parameters	Description
Name	Loin Eye Area - Planimeter
Units	Square centimeters (cm^2)
Category	Objective - Reference
Range	30-70 cm^2
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C
Cautions	
Material	Acetate or tracing paper, pencil, manual or electronic planimeter
Methodology	To be measured on a cold, ribbed carcass or loin at the 3rd/4th last rib by tracing the perimeter of the *Longissimus dorsi* muscle (loin eye) on acetate paper and determining the area using a manual or electronic planimeter with an appropriate software program
Pictures	  
References	B. Bereskin and L. T. Frobish, 1982. J. Anim.Sci., 55:554-564.

Factsheet # CMQS-115

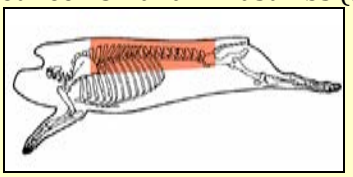
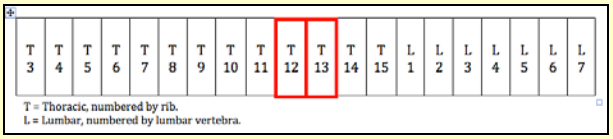
Loin Eye Area - Plastic Grid

Updated 2012-12-12

Parameters	Description
Name	Loin Eye Area - Plastic Grid
Units	Square centimeters (cm^2)
Category	Objective
Range	30-70 cm^2
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C
Cautions	
Material	plastic grid (Grid AS-235e, Iowa State University)
Methodology	To be measured on a cold, ribbed carcass or loin at the 3rd/4th last rib by plastic grid (Grid AS-235e, Iowa State University). Place the grid over the actual loin or over a tracing of the loin eye. Lay the grid so that one or more of the areas blocked out by the heavy black lines falls within the loin eye outline. Count the dots within the loin eye outside the blocked areas. Add the number of dots to the 40, 60 or 80 dots enclosed by the heavy black lines. Divide the total number of dots by 20 to get the loin eye area in square inches. Convert to square centimeters.
Pictures	  
References	Iowa State University, 2006. Plastic Grid for Quick Measurement of Loin Eye (Pork and Lamb). AS-235E.

Loin Eye Area - image analysis

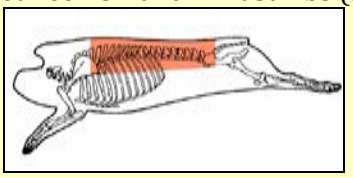
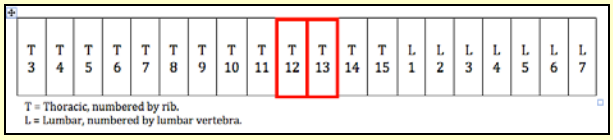
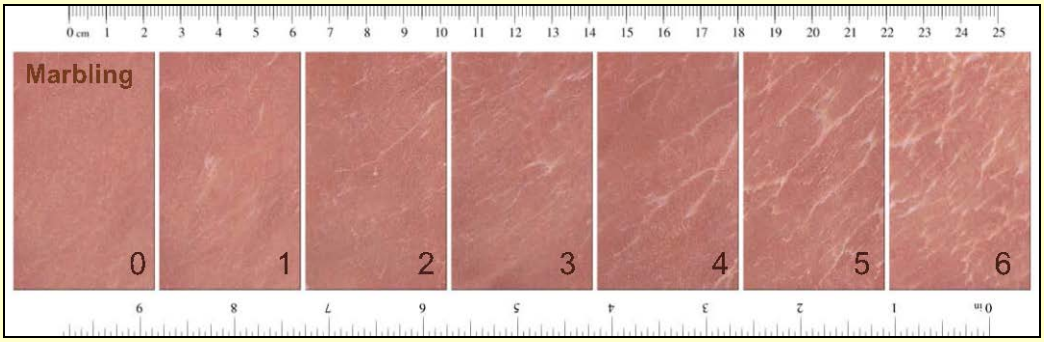
Updated 2012-12-12

Parameters	Description
Name	Loin Eye Area - image analysis
Units	Square centimeters (cm^2)
Category	Objective
Range	30-70 cm^2
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C
Cautions	
Material	Camera, ruler, image analysis software (ex: ImageJ)
Methodology	To be measured on a cold, ribbed carcass or loin chop at the 3rd/4th last rib by analyzing an image taken in appropriate light conditions. Take a picture of the 3rd or 4th rib chop, with and without a plastic ruler. Alternatively, take only one picture with ruler pre-set at chop height. Open the image analysis software and set up the reference scale by drawing a line over the ruler and specifying the actual length. Then use the area tools to trace the loin eye and compute its area.
Pictures	  
References	CDPQ, 2011. Development of a standard method to assess loin eye area using digital pictures. Project report, 27pp http://fiji.sc/wiki/index.php/Main_Page

Factsheet # CMQS-201

Loin Marbling Score - Canadian Standard

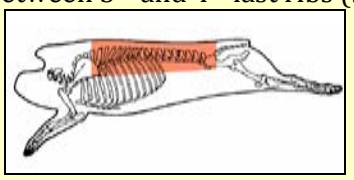
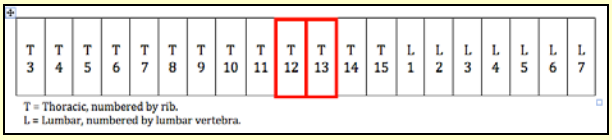
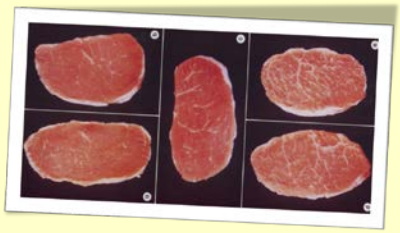
Updated 2012-12-12

Parameters	Description
Name	Loin Marbling Score - Canadian Standard
Units	Points (pts)
Category	Subjective
Range	0-6
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	20 minutes
Temperature	Room temperature <10° C; Meat temperature <4° C
Cautions	Good lighting – preferably fluorescent white Daylight 65
Material	Clean knife Canadian Marbling Standards (0-6)
Methodology	To be evaluated on a cold, ribbed carcass or loin chop. Cut the loin between the 3rd and 4th last ribs. Remove any meat and fat residue on the cut surface. Determine the marbling score by comparing the chop with the Canadian chart (evaluate the overall area and provide an average if necessary). Marbling is determined based on a subjective score ranging from 0 to 6. Score to the nearest half point. Preferably score both sides of the 3rd or 4th last chop to compute an average score.
Pictures	
References	

Factsheet # CMQS-202

Loin Marbling Score - AAFC Standard

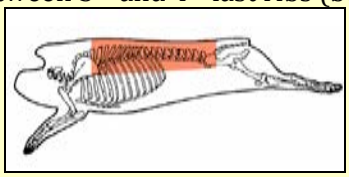
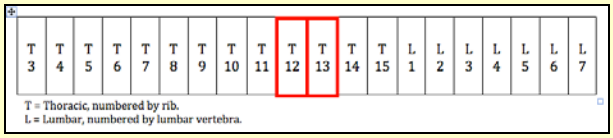
Updated 2012-12-12

Parameters	Description
Name	Loin Marbling Score - AAFC Standard
Units	Points (pts)
Category	Subjective
Range	1-5
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	20 minutes
Temperature	Room temperature <10° C; Meat temperature <4° C
Cautions	Good lighting – preferably fluorescent white Daylight 65
Material	Clean knife AAFC Marbling Standards (1-5)
Methodology	To be evaluated on a cold, ribbed carcass or loin chop. Cut the loin between the 3rd and 4th last ribs. Remove any meat and fat residue on the cut surface. Determine the marbling score by comparing the chop with the AAFC chart (evaluate the overall area and provide an average if necessary). Marbling is determined based on a subjective score ranging from 1 to 5 where: 1=trace, 2=slight, 3=small, 4=moderate, 5=abundant. Preferably score both sides of the section to compute an average score.
Pictures	 
References	Agriculture Canada Publication 1879/E – Marbling Standards for Beef and Pork Carcasses

Factsheet # CMQS-203

Loin Marbling Score - NPPC Standard

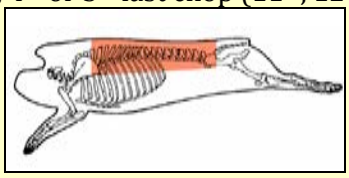
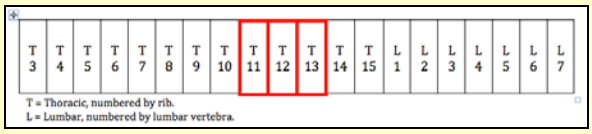
Updated 2012-12-12

Parameters	Description
Name	Loin Marbling Score - NPPC Standard
Units	Points (pts)
Category	Subjective
Range	1-10 (half points accepted). Corresponds to 1-10% of intramuscular fat.
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	20 minutes
Temperature	Room temperature <10°C; Meat temperature <4°C
Cautions	Good lighting – preferably fluorescent white Daylight 65
Material	Clean knife NPPC Marbling Standards Cards (1-10)
Methodology	To be evaluated on a cold, ribbed carcass or loin chop. Cut the loin between the 3rd and 4th last ribs. Remove any meat and fat residue on the cut surface. Evaluate the marbling score by comparing the sample with the NPPC chart (evaluate the overall area and provide an average if necessary). Score to the nearest half point. Preferably score both sides of the 3rd or 4th last chop to compute an average score.
Pictures	
References	National Pork Producers Council, 2000. Pork Composition & Quality Assessment Procedures, edited by Dr. Eric Berg, published by, Des Moines, Iowa, (515) 223-2600. Publisher: National Pork Board.

Factsheet # CMQS-204

Loin Intramuscular Fat - chemical

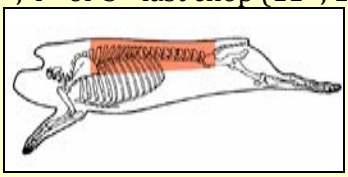
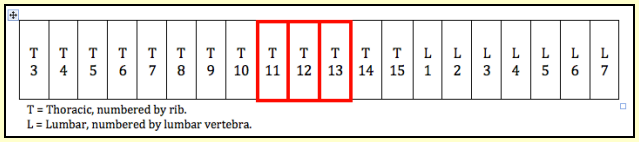
Updated 2012-12-12

Parameters	Description
Name	Loin Intramuscular Fat - chemical
Units	% IMF
Category	Objective – Reference
Range	0 – 10%
Site	3rd, 4th or 5th last chop (11th, 12th or 13th rib)  
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	
Cautions	
Material	Loin eye sample, deboned and defatted, and all external connective tissue removed Food processor (chopper)
Methodology	Mince each of the samples using the food processor for about one minute or until a homogenous paste is obtained. It is important to take the entire sample (loin eye), including the exudate that may be found in the bottom of the bag. The bag may contain variable quantities of drip and non-negligible humidity, which could interfere with the content level of different constituents. The intramuscular lipids are measured by extraction in a Soxhlet apparatus with petroleum ether (AOAC, 1990 – Method 960.39) or with methanol and chloroform according to the TL method of Bligh and Dyer (1959).
Pictures	
References	- Association of Official Analytical Chemists. 1990. Official Methods of Analysis: Fat or Ether Extract in Meat, 15th edition. AOAC, Washington. - Bligh, E.G., and W.J. Dyer. 1959. Can. J. of Biochem. and Physiol. 37:911.

Factsheet # CMQS-205

Loin Intramuscular Fat - Near Infrared

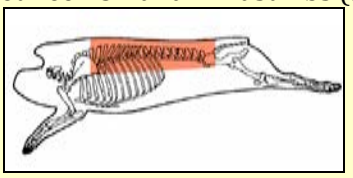
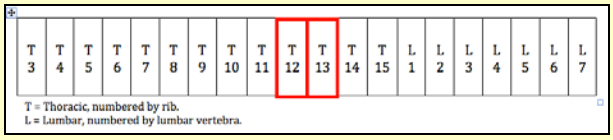
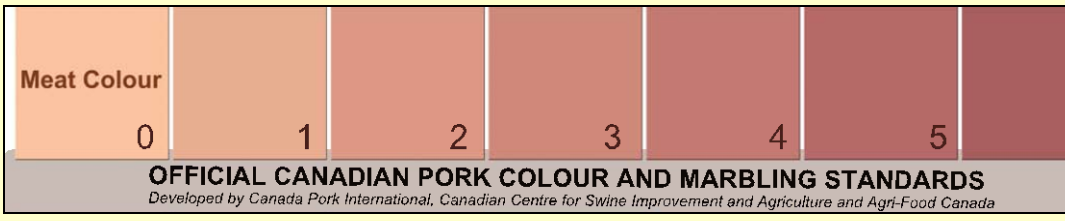
Updated 2012-12-12

Parameters	Description
Name	Loin Intramuscular Fat - Near Infrared
Units	Percent (%)
Category	Objective
Range	0-10%
Site	3rd, 4th or 5th last chop (11th, 12th or 13th rib)  
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	
Cautions	The sample size should be sufficient to fill up the cup
Material	Loin eye sample, deboned, defatted, and all external connective tissue removed, food processor (chopper), FOSS Foodscan™ Lab equipment, small sample cup (internal diameter of 130 mm; height 10 mm)
Methodology	Mince each of the samples using the food processor for about one minute or until a homogenous paste is obtained. It is important to take the entire sample (loin eye), including the exudate that may be found in the bottom of the bag. The bag may contain variable quantities of drip and non-negligible humidity, which could interfere with the content level of different constituents. Place a minced sample in the sample cup; there has to be enough sample to entirely cover the bottom of the sample cup. Avoid large air pockets or holes in the sample in the cup because it may affect the results of the analysis. It is important that the sample cup is always at the same level each time you analyze a particular product. For that same reason, the sample cup must be filled in a similar fashion each time. It is recommended that the user determine the volume needed to fill a cup to the desired level, and always measure out and use that volume.
Pictures	  
References	

Factsheet # CMQS-206

Loin Colour Score - Canadian Standard

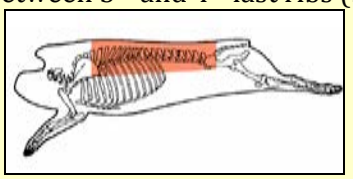
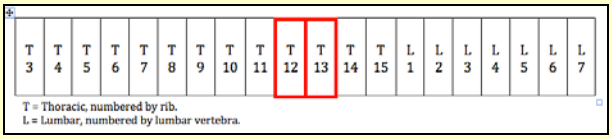
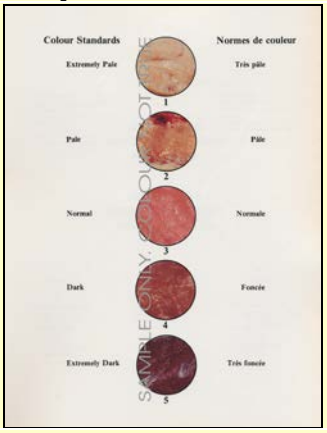
Updated 2012-12-12

Parameters	Description
Name	Loin Colour Score - Canadian Standard
Units	Points (pts)
Category	Subjective
Range	0-6 (half-points accepted)
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	20 minutes
Temperature	Room temperature <10°C; Meat temperature < 4°C
Cautions	Good lighting – preferably fluorescent white Daylight 65
Material	Clean knife Canadian Colour Standards (0-6)
Methodology	To be evaluated on a cold, ribbed carcass or loin. Cut the loin between the 3rd and 4th last ribs. Remove any meat residue on the cut surface. Determine the colour score by comparing the sample with the Canadian chart (evaluate the overall area and provide an average if necessary). Colour subjective scores range from 0 to 6.
Pictures	
References	

Factsheet # CMQS-207

Loin Colour Score - AAFC Standard

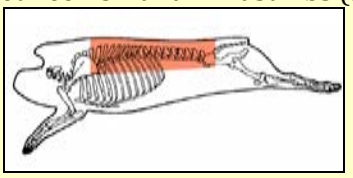
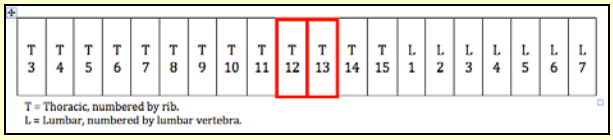
Updated 2012-12-12

Parameters	Description
Name	Loin Colour Score - AAFC Standard
Units	Points (pts)
Category	Subjective
Range	1-5
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	20 minutes
Temperature	Room temperature <10°C; Meat temperature < 4°C
Cautions	Good lighting – preferably fluorescent white Daylight 65
Material	Clean knife AAFC Colour Standards (1-5)
Methodology	To be evaluated on a cold, ribbed carcass or loin. Cut the loin between the 3rd and 4th last ribs. Remove any meat and fat residue on the cut surface. Determine the colour score by comparing the sample with the AAFC chart (evaluate the overall area and provide an average if necessary). Colour subjective scores range from 1 to 5 where: 1=extremely pale, 2=pale, 3=normal, 4=dark, 5=extremely dark
Pictures	
References	Agriculture Canada Publication 5180/B – Pork Quality – A guide to understand colour and structure of pork muscle

Factsheet # CMQS-208

Loin Colour Score - NPPC Standard

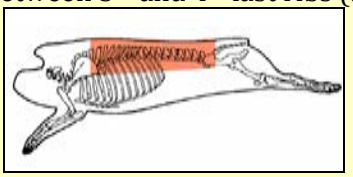
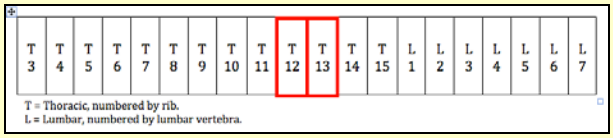
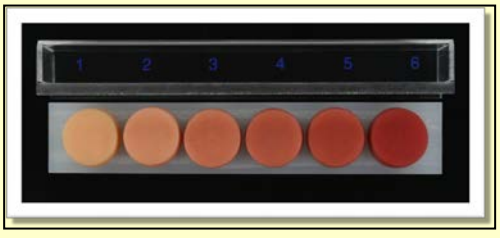
Updated 2012-12-12

Parameters	Description
Name	Loin Colour Score - NPPC Standard
Units	Points (pts)
Category	Subjective
Range	1 to 6 (half-points accepted)
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	20 minutes
Temperature	Room temperature <10°C; Meat temperature < 4°C
Cautions	Good lighting – preferably fluorescent white Daylight 65
Material	Clean knife NPPC Colour Standards Cards (1-6)
Methodology	To be evaluated on a cold, ribbed carcass or loin. Cut the loin between the 3rd and 4th last ribs. Remove any meat and fat residue on the cut surface. Determine the colour score by comparing the sample with the NPPC chart (evaluate the overall area and provide an average if necessary). If possible, score both sides of the cut loin, or both sides of the sampled chop (3rd/4th last chop) and report the average.
Pictures	
References	National Pork Producers Council, 2000. Pork Composition & Quality Assessment Procedures, edited by Dr. Eric Berg, published by, Des Moines, Iowa, (515) 223-2600. Publisher: National Pork Board.

Factsheet # CMQS-209

Loin Colour Score - Japanese Standard

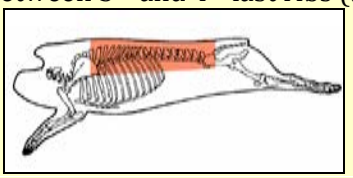
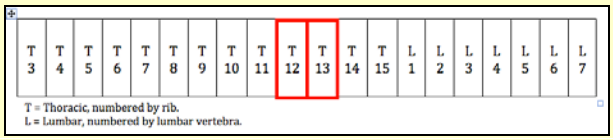
Updated 2012-12-12

Parameters	Description
Name	Loin Colour Score - Japanese Standard
Units	Points (pts)
Category	Subjective
Range	0.5 to 6 (half points accepted)
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	20 minutes
Temperature	Room temperature <10°C; Meat temperature <4°C
Cautions	Good light – preferably fluorescent white Daylight 65
Material	Clean knife, Japanese Colour Standards (1-6)
Methodology	To be evaluated on a cold, ribbed carcass or loin chop. Cut the loin between the 3rd and 4th last ribs. Remove any meat residue on the cut surface. Determine the colour score by comparing the sample with the Japanese colour standards (evaluate the overall area and provide an average if necessary). Subjective score ranges from 0.5 to 6 with half-point increments, thus 12 different classifications are possible. If possible, score both sides of the cut loin, or both sides of the sampled chop (3rd/4th last chop) and report the average.
Pictures	 
References	Nakai, H., F. Saito, T. Ikeda, S. Ando, and A. Komatsu, 1975. Standard Models of Pork-Colour. Bulletin of National Institute of Animal Husbandry 29.

Factsheet # CMQS-210

Loin Minolta Colour

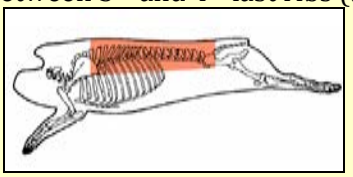
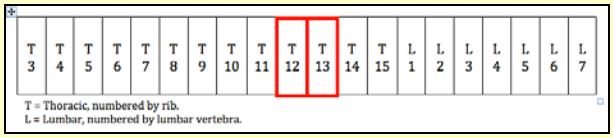
Updated 2012-12-12

Parameters	Description
Name	Loin Minolta Colour
Units	Commission Internationale de l'Éclairage (CIE, 1976) L* a* b* scale (L* is a measure of luminosity with a higher value being indicative of a lighter colour, a* is a measure of the continuum from red to green, and b* is a measure of the continuum from yellow to blue)
Category	Objective – Reference
Range	L*: 40-65; a*: 0-15; b*:0-15
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	20 minutes
Temperature	Room temperature <10°C; Meat temperature <4°C
Cautions	Preferably perform Minolta measures prior to pH assessment to avoid any effect of holes left by the pH probe on colour assessment. Avoid obvious fat and connective tissues as they may interfere with the colour assessment. It is recommended that the viewing port of any machine that opens directly into the integrating sphere be fitted with a special quartz optical glass that will be keep meat juices from getting inside the machine.
Material	Clean knife, Minolta Colorimeter (CR-300, CR-400, CM-2002) Calibration white ceramic tile (CR-A43)
Methodology	Check the calibration of the colorimeter before each batch or after the device is not used for 30 minutes or more, using a proper white ceramic tile. Illuminant D65 and a 0° view angle must be used. A minimum of two measurements is recommended per sample for a representative assessment. One measurement should be taken on the ventral side and the other on the dorsal side.
Pictures	
References	

Factsheet # CMQS-211

Loin Structure Score - AAFC Standard

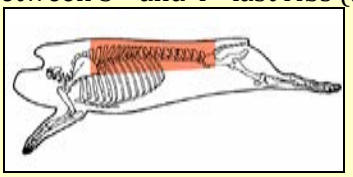
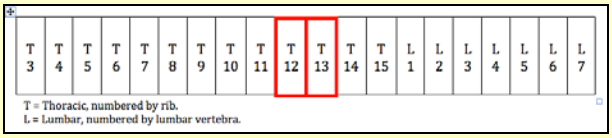
Updated 2012-12-12

Parameters	Description
Name	Loin Structure Score - AAFC Standard
Units	Points
Category	Subjective
Range	1-5
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	20 minutes
Temperature	Room temperature <10°C; Meat temperature <4°C
Cautions	Good light – preferably fluorescent white Daylight 65
Material	Clean knife AAFC Structure Standards (1-5)
Methodology	To be evaluated on a cold, ribbed carcass or loin between the 3rd/4th last ribs, using Agriculture Canada publication 5180/B - Pork Quality - A Guide to Understanding Colour and Structure of Pork Muscle. Visual subjective scores range from 1 to 5 where: 1 = extremely soft & exudative 2 = soft & exudative 3 = normal 4 = firm & dry 5 = extremely firm & dry
Pictures	
References	Agriculture Canada publication 5180/B - Pork Quality - A Guide to Understanding Colour and Structure of Pork Muscle

Factsheet # CMQS-212

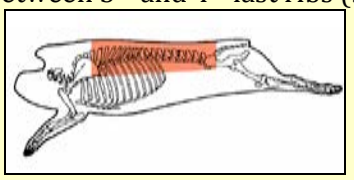
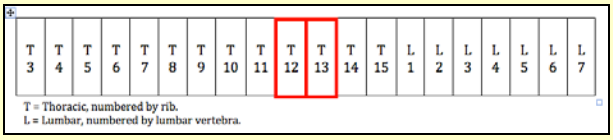
Trait: Loin Firmness Score - NPPC Standard

Updated 2012-12-12

Parameters	Description
Name	Loin Firmness Score - NPPC Standard
Units	Points (pts)
Category	Subjective
Range	1 to 3
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature < 10°C; Meat temperature between 0 and 4°C
Cautions	
Material	Clean knife
Methodology	Cut the bone-in loin between the 3rd and 4th last ribs. Hold the cut loin vertically on a table. Subjectively assess the firmness by palpation using the index and the middle finger at the centre of the loin cross-section using the NPPC scoring chart. Subjective scores range from 1 to 3 where: 1 = soft 2 = firm 3 = very firm
Pictures	
References	National Pork Producers Council, 2000. Pork Composition & Quality Assessment Procedures, edited by Dr. Eric Berg. Publishers: National Pork Board.

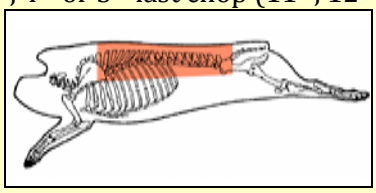
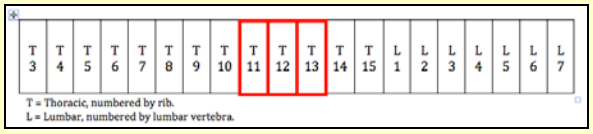
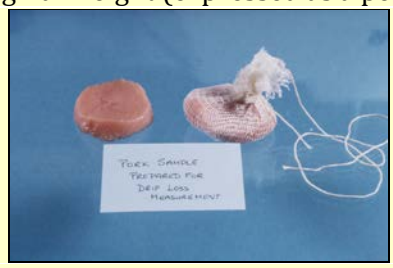
Loin Firmness - Durometer

Updated 2012-12-12

Parameters	Description
Name	Loin Firmness - Durometer
Units	
Category	Objective – Reference
Range	0-100
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C; Meat temperature <4°C
Cautions	
Material	Clean knife, digital durometer (ex: Rex SP-590, ASTM D2240), type OO or OOO, fitted with a large base
Methodology	The durometer must be calibrated regularly using a firm surface (value 100) and rubber calibration blocks. Cut the loin between the 3rd and 4th last ribs. Hold the cut loin vertically on a table. Position the durometer at the centre of the loin section vertically and without exerting any pressure on the instrument. Read the value provided after a few seconds, when stabilized. The foot and ball or pin of the durometer must be cleaned after each reading in order to avoid fluid or fat from affecting the readings.
Pictures	 
References	www.rexgauge.com Rincker, P.J., Killerfer, J. and F.K. McKeith. 2007. Meat Science, 77: 213-219

Loin Drip Loss - Bag

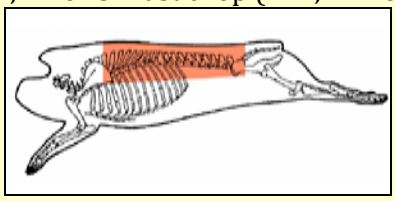
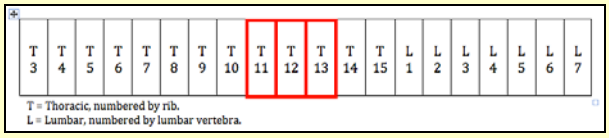
Updated 2012-10-15

Parameters	Description
Name	Loin Drip Loss - Bag
Units	Percentage (%)
Category	Objective – Reference
Range	0 to 10% (amount of water loss expressed as a fraction of the initial sample weight)
Site	3rd, 4th or 5th last chop (11th, 12th or 13th rib)  
Measurement Time	24 hours after slaughter (preparation of samples) – 72 hours after slaughter (measurement)
Blooming	NA
Temperature	Preparation at <10°C ; Storage at 2-4°C
Cautions	
Material	Polyethylene bags, clean knife, numbered hooks or string, airtight container
Methodology	To be measured using a 25-mm thick section of the *Longissimus dorsi* (loin). A meat sample weighing about 100g is recommended. The sample is placed in a bag and then hung in an airtight container using a hook under the lid. After the required storage time (48 h at 2 to 4°C), the sample is weighed again. Duplicate samples should be used to obtain an average value with not more than 2 grams difference in the initial weights of the samples. The drip loss is the difference between the original weight and the weight of the sample after 48 hours divided by the original weight (expressed as a percentage).
Pictures	 
References	Honikel, K. O. 1998. Reference methods for the assessment of physical characteristics of meat. Meat Sci. 49: 447–457 Mérour, I., L. Riendeau, L. Maignel, J. Rivest, and A. Vautier. 2007. Journées de la Recherche Porcine 39:215-222.

Factsheet # CMQS-215

Loin Drip Loss - Tray

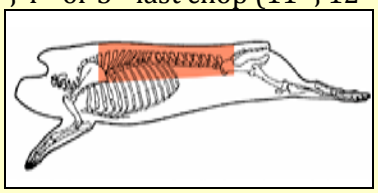
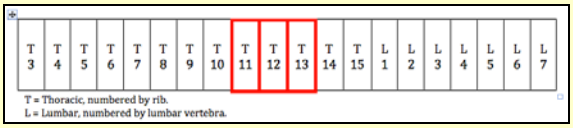
Updated 2012-12-10

Parameters	Description
Name	Loin Drip Loss - Tray
Units	Percentage (%)
Category	Objective
Range	0 to 10% (amount of water loss expressed as a fraction of the initial sample weight)
Site	3rd, 4th or 5th last chop (11th, 12th or 13th rib)  
Measurement Time	24 hours after slaughter (preparation of samples) – 72 hours after slaughter (measurement)
Blooming	NA
Temperature	Preparation at <10°C ; Storage at 2-4°C
Cautions	
Material	Clean knife, Styrofoam trays (15x15x4cm), absorbent pads (9x15cm), scale, polyvinyl film
Methodology	Sample and weigh a 2-cm thick chop, wrap the sample with oxygen-permeable polyvinyl film on a Styrofoam tray containing an absorbent pad and store for 48 hours at 2 to 4°C. The drip loss is the difference between the original weight and the weight of the sample after 48 hours divided by the original weight (expressed as a percentage). Duplicate measures are recommended when possible.
Pictures	
References	Otto, G., R. Roehe, H. Looft, L. Thoelking, and E. Kalm. 2004. Meat Science 68, 401-409. Mérour, I., L. Riendeau, L. Maignel, J. Rivest, and A. Vautier. 2007. Journées de la Recherche Porcine 39:215-222.

Factsheet # CMQS-216

Loin Drip Loss - EZ Drip

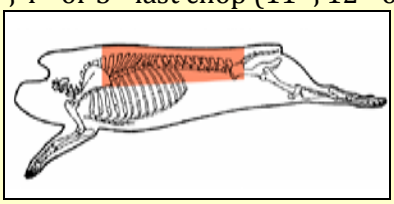
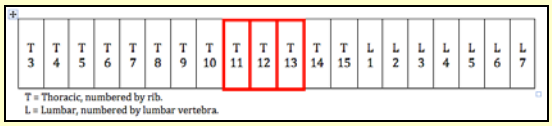
Updated 2012-12-12

Parameters	Description
Name	Loin Drip Loss - EZ Drip
Units	Percentage (%)
Category	Objective
Range	0 -10% (amount of water loss expressed as a fraction of the initial sample weight)
Site	3rd, 4th or 5th last chop (11th, 12th or 13th rib)  
Measurement Time	24 hours after slaughter (preparation of samples) – 72 hours after slaughter (measurement)
Blooming	NA
Temperature	Preparation <10°C – Storage 2-4°C
Cautions	
Material	Meat juice collectors, reference 86.290, SARSTEDT company, scale (precision 0.01g), pliers or tweezers, numbered stickers, absorbent paper, sampling corer (25mm diameter), tube holder
Methodology	Before sampling, prepare the numbered tubes and weigh each of them (empty weight). Prepare meat samples per chop using a 25-mm cork borer, cutting in the meat fibre direction. The sample cylindrical, 25 mm in diameter and 25 mm in thickness. Put each sample in a meat juice collecto store vertically at 2 to 4°C. After 48 hours, weigh each tube with the sample inside, then care remove sample with tweezers, dry with absorbent paper and weigh each meat sample. The drip is the difference between the original weight and the weight of the sample after 48 hours divide the original weight (expressed as a percentage).
Pictures	 
References	Mérour, I., L. Riendeau, L. Maignel, J. Rivest, and A. Vautier. 2007. Journées de la Recherche Porcine 39:215-222. Rassmussen, A.J., and Andersson, M. (1996) In *Proceedings 42nd International Congress of Meat Science and Technology*, Lillehammer (pp. 286 - 287). SARSTEDT website: www.sarstedt.com

Factsheet # CMQS-217

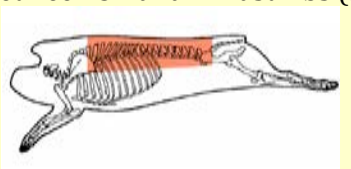
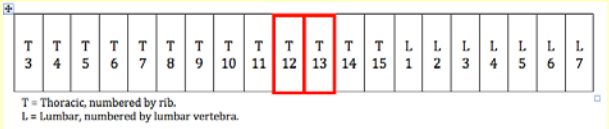
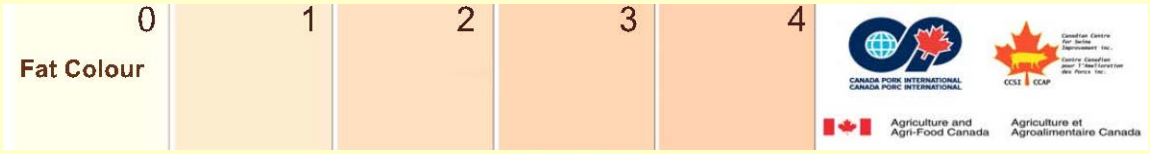
Loin Cooking Loss

Updated 2012-12-10

Parameters	Description
Name	Loin Cooking Loss
Units	Percentage (%)
Category	Objective - Reference
Range	0-30% (amount of water loss expressed as a fraction of the initial sample weight)
Site	3rd, 4th or 5th last chop (11th, 12th or 13th rib)  
Measurement Time	24 hours after slaughter on fresh samples, or anytime after slaughter on frozen and thawed samples
Blooming	NA
Temperature	
Cautions	This measurement can be done as part of the shear force assessment. A precise scale is required. Thawing conditions should be consistent since they can affect how much moisture is released from a meat sample (24h at 2°C is recommended).
Material	Scale (precision of 0.01g), knife, water bath, polyethylene bags, thermocouple
Methodology	Put individual samples in thin-walled polyethylene bags and place them in the water bath with the bags open and extending above the water surface. Treatments are stopped after the samples reach specified core temperatures of 55°C (rare), 65°C (medium), 80°C (well done) and 95°C (thoroughly cooked) assessed with thermocouples. Samples are removed from the water bath and cooled for 30 minutes under running tap water at about 15°C. Later on, the meat is taken from the bag, mopped dry and weighed. The cooking loss is expressed as g lost / g initial weight or as % cook loss (based either on the original weight or on the original water content of the sample).
Pictures	
References	Honikel, K.-O. (1996). Food Chemistry, 54(4), 573-582.

Fat Colour Score - Canadian Standard

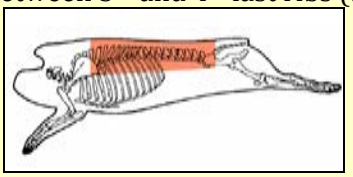
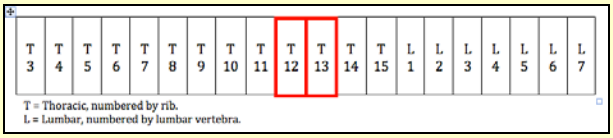
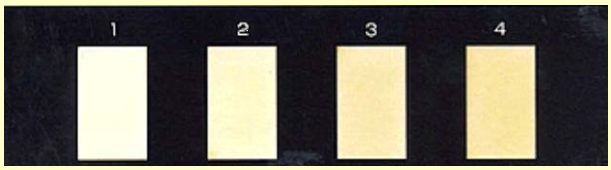
Updated 2012-10-15

Parameters	Description
Name	Fat Colour Score - Japanese Standard
Units	Points (pts)
Category	Subjective
Range	0 to 4
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	20 minutes
Temperature	Room temperature <10°C; Meat temperature 0 to 4°C
Cautions	Good light, preferably fluorescent Daylight 65
Material	Clean knife, Canadian Fat Colour Standards (0-4)
Methodology	To be evaluated on a cold, ribbed carcass or loin. Cut the loin between the 3rd and 4th last ribs. Remove any meat residue on the cut surface. Evaluate the fat colour score by comparing the backfat of the cut surface with the Canadian colour standards. Alternatively, fat colour can be assessed on the large exposed backfat of a skinned loin. The subjective scores range from 0 to 4, with 0 being the palest colour and 4 the darkest one.
Pictures	
References	Nakai, H., F. Saito, T. Ikeda, S. Ando, and A. Komatsu, 1975. Standard Models of Pork-Colour. Bulletin of National Institute of Animal Husbandry 29

Factsheet # CMQS-219

Fat Colour Score - Japanese Standard

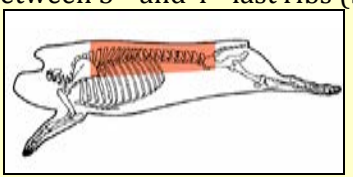
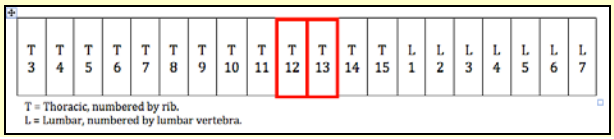
Updated 2012-12-10

Parameters	Description
Name	Fat Colour Score - Japanese Standard
Units	Points (pts)
Category	Subjective
Range	1 to 4
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	20 minutes
Temperature	Room temperature <10°C; Meat temperature 0 to 4°C
Cautions	Good light, preferably fluorescent Daylight 65
Material	Clean knife, Japanese Fat Colour Standards (1-4)
Methodology	To be evaluated on a cold, ribbed carcass or loin. Cut the loin between the 3rd and 4th last ribs. Remove any meat residue on the cut surface. Evaluate the fat colour score by comparing the backfat of the cut surface with the Japanese colour standards. Alternatively, fat colour can be assessed on the large exposed backfat of a skinned loin. The subjective scores range from 1 to 4, with 1 being the palest colour and 4 the darkest one.
Pictures	
References	Nakai, H., F. Saito, T. Ikeda, S. Ando, and A. Komatsu, 1975. Standard Models of Pork-Colour. Bulletin of National Institute of Animal Husbandry 29

Factsheet # CMQS-220

Fat Minolta Colour

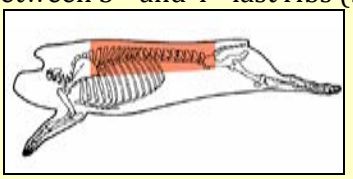
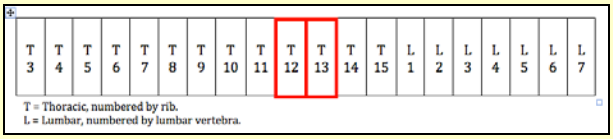
Updated 2012-12-10

Parameters	Description
Name	Fat Minolta Colour
Units	Commission Internationale de l'Éclairage (CIE, 1976) L^* a^* b^* scale (L^* is a measure of luminosity with a higher value being indicative of a lighter colour, a^* is a measure of the continuum from red to green, and b^* is a measure of the continuum from yellow to blue)
Category	Objective – Reference
Range	
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	20 minutes
Temperature	Room temperature <10°C; Meat temperature 2 to 4°C
Cautions	It is recommended that the viewing port of any machine that opens directly into the integrating sphere be fitted with a special quartz optical glass that will be keep meat juices from getting inside the machine.
Material	Clean knife Minolta Colorimeter (CR-300, CR-400, CM-2002) Calibration white ceramic tile (CR-A43)
Methodology	Check the calibration of the colorimeter before each batch or after the device has not been in use for 30 minutes or more, using a white ceramic tile. Illuminant D65 and a 0° view angle must be used. A minimum of two measurements is recommended per sample for a representative assessment. One measurement should be taken on the ventral side and one on the dorsal side. Alternatively, this measure can be taken on the outside of the loin after the skin is removed but before the fat is removed.
Pictures	
References	

Factsheet # CMQS-221

Fat Firmness Score - Japanese Standard

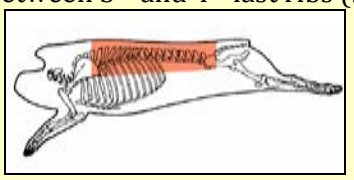
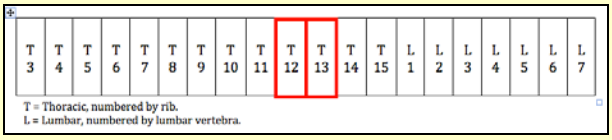
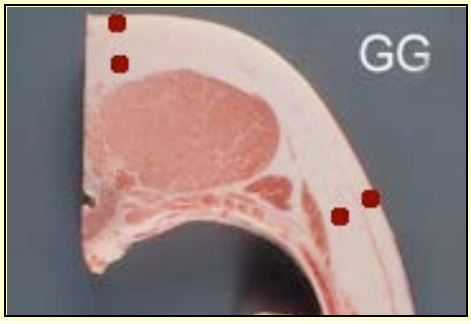
Updated 2012-12-10

Parameters	Description
Name	Fat Firmness Score - Japanese Standard
Units	Points (pts)
Category	Subjective
Range	1-4
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C ; Meat temperature 2 to 4°C
Cautions	
Material	
Methodology	Can be objectively assessed using the Bristol Fat Hardness Meter, but due to the lack of availability of this equipment, it is recommended that fat hardness be subjectively assessed by palpation at 2 to 4°C using the Japanese Fat Softness Score (JFSS). Subjective scores range from 1 to 4 where: 1 = soft 2 = slightly soft 3 = slightly hard 4 = hard
Pictures	
References	Japanese Meat Grading Association

Factsheet # CMQS-222

Fat Firmness - Durometer

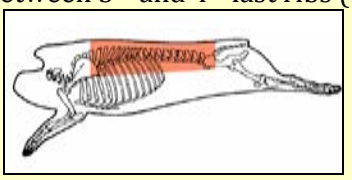
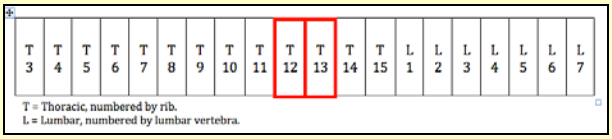
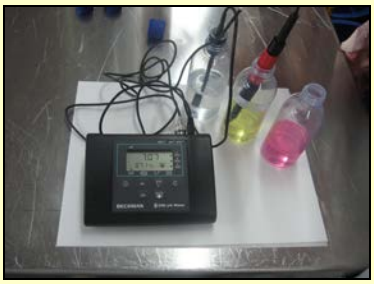
Updated 2012-12-10

Parameters	Description
Name	Fat Firmness - Durometer
Units	
Category	Objective
Range	0-100
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C; Meat temperature <4°C
Cautions	
Material	Clean knife, digital durometer (ex: Rex SP-590, ASTM D2240), type 00 or 000, fitted with a large base
Methodology	The durometer must be calibrated regularly using a firm surface (value 100) and the user calibrated using rubber calibration blocks. Cut the loin between the 3rd and 4th last ribs. Hold the loin cut vertically on a table. Position the durometer vertically without exerting any pressure on the instrument to measure at four different sites: 1st and 2nd layers, dorsal side and 1st and 2nd layers, ventral side. Read the value provided after a few seconds, when stabilized. Alternatively, this measure can be taken on the shoulder of the split carcass where the fat is always thick. The foot and ball or pin of the durometer must be cleaned after each reading in order to avoid fluid or fat from affecting the readings.
Pictures	 
References	www.rexgauge.com

Factsheet # CMQS-223

Loin 24hr pH

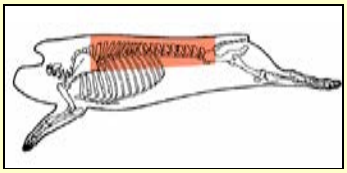
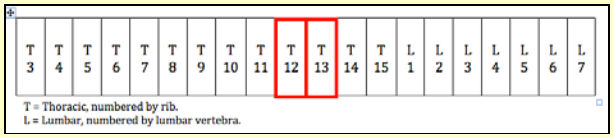
Updated 2012-12-10

Parameters	Description
Name	Loin 24hr pH
Units	pH units (accuracy of 0.01 unit)
Category	Objective
Range	5.0 - 7.0
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C ; Meat temperature < 4°C
Cautions	When measuring pH on a loin cross-section, it is recommended to avoid inserting the electrode into fat tissues, which have a pH of 6 or more and tend to gum up the electrode.
Material	pH meter (with automatic temperature compensation and capable of measuring to an accuracy of 0.01 units), buffer solutions of pH 7 and pH 4 kept at the same temperature as the meat (0 to 4°C), KCl solution to store the electrode
Methodology	To be measured using a pH meter (i.e. Fisher, Beckman, Cole Parmer). The probe is inserted in the loin cross-section at the 3rd/4th last rib to a depth of 3 cm. Alternatively, the measurement can be made on a split carcass. A minimum of 2 measurements is recommended to obtain an average value. One measurement should be taken on the ventral side and the other on the dorsal side. The pH meter should be recalibrated before each session and checked regularly (about every 20 measures).
Pictures	 
References	

Factsheet # CMQS-224

Loin Conductivity

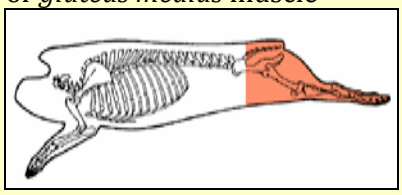
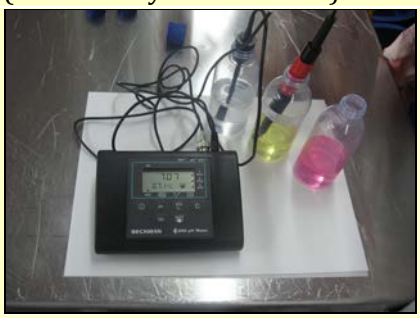
Updated 2012-12-10

Parameters	Description
Name	Loin Conductivity
Units	
Category	Objective
Range	
Site	Between 3rd and 4th last ribs (between 12th and 13th ribs)  
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C ; Meat temperature 0 to 4°C
Cautions	It is important to work on a surface that does not conduct electricity. The measurement should be done before the pH measurement to avoid potential effects of holes in the meat on the conductivity measures.
Material	Conductimeter (YSI scientific, model 34, with 2 electrodes linked by a plastic box; reading frequency: 1.7477 MHz or equivalent)
Methodology	Calibrate and choose the right scale (for lean tissue) on the conductimeter. Measure conductivity by inserting both electrodes at the centre of the loin section. For each measure, insert electrodes and wait for 2-3 seconds before reading.
Pictures	
References	

Factsheet # CMQS-301

Ham 24hr pH

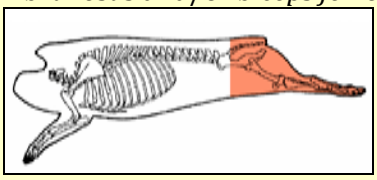
Updated 2012-12-10

Parameters	Description
Name	Ham 24hr pH
Units	pH units (accuracy of 0.01unit)
Category	Objective
Range	5.0 – 7.0
Site	*semimembranosus* muscle or *gluteus medius* muscle 
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C ; Meat temperature < 4°C
Cautions	When measuring pH on a loin cross-section, it is recommended to avoid inserting the electrode into fat tissues, which have a pH of 6 or more and tend to gum up the electrode.
Material	pH meter (with automatic temperature compensation and capable of measuring to an accuracy of 0.01 units), buffer solutions of pH 7 and pH 4 kept at the same temperature as the meat (0 to 4°C), KCl solution to store the electrode
Methodology	To be measured using a pH meter (i.e. Fisher, Beckman, Cole Parmer). The probe is inserted in the *semimembranosus* muscle or the *gluteus medius* muscle to a depth of 3 cm. A minimum of two measurements is recommended to obtain an average value. The pH meter should be recalibrated before each session and checked regularly (about every 20 measures).
Pictures	 
References	

Factsheet # CMQS-302

Ham Minolta Colour

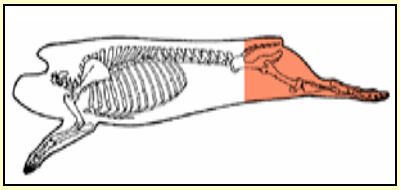
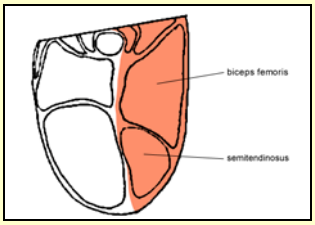
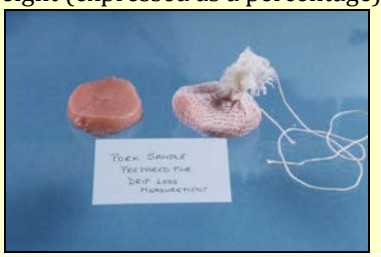
Updated 2012-12-10

Parameters	Description
Name	Ham Minolta Colour
Units	Commission Internationale de l'Éclairage (CIE, 1976) L^* a^* b^* scale (L^* is a measure of luminosity with a higher value being indicative of a lighter colour, a^* is a measure of the continuum from red to green, and b^* is a measure of the continuum from yellow to blue)
Category	Objective – Reference
Range	L*: 40-65; a*: 0-15; b*:0-15
Site	*Gluteus medius* and *semimembranosus* and/or *biceps femoris* 
Measurement Time	24 hours after slaughter
Blooming	20 minutes
Temperature	Room temperature <10°C; Meat temperature <4°C
Cautions	Preferably perform Minolta measures prior to pH assessment to avoid any effect of holes left by the pH probe on colour assessment. Avoid obvious fat and connective tissues as they may interfere with the colour assessment. It is recommended that the viewing port of any machine that opens directly into the integrating sphere be fitted with a special quartz optical glass that will be keep meat juices from getting inside the machine.
Material	Clean knife, Minolta Colorimeter (CR-300, CR-400, CM-2002) Calibration white ceramic tile (CR-A43)
Methodology	Check the calibration of the colorimeter before each batch or after the device is not used for 30 minutes or more, using a proper white ceramic tile. Illuminant D65 and a 0° view angle must be used. The measurement can be made on the external surface of the primal-cut ham (*gluteus medius* muscle), or internally on the *semimembranosus* and/or *biceps femoris* muscle. A minimum of two measurements is recommended with most meter models to obtain a representative value.
Pictures	 
References	

Factsheet # CMQS-303

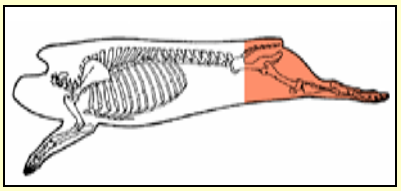
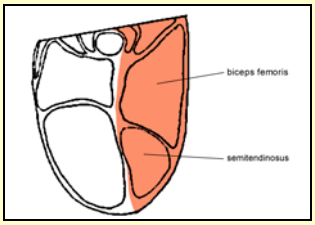
Ham Drip Loss - Bag

Updated 2012-12-10

Parameters	Description
Name	Ham Drip Loss - Bag
Units	Percentage (%)
Category	Objective - Reference
Range	0 to 10% (amount of water loss expressed as a fraction of the initial sample weight)
Site	*Biceps femoris*  
Measurement Time	24 hours after slaughter (preparation of samples) – 72 hours after slaughter (measurement)
Blooming	NA
Temperature	Preparation at <10°C ; Storage at 2-4°C
Cautions	
Material	Polyethylene bags, clean knife, numbered hooks or string, airtight container
Methodology	To be measured using a 25-mm thick section of the *Biceps femoris*, to be cut perpendicular to muscle fibre direction. A meat sample weighing about 100g is recommended. The sample is placed in a bag and then hung in an airtight container using a hook under the lid. After the required storage time (48 h at 2 to 4°C - a longer time is not recommended), the sample is weighed again. Duplicate samples should be used to obtain an average value with not more than 2 grams difference in the initial weights of the samples. The drip loss is the difference between the original weight and the weight of the sample after 48 hours divided by the original weight (expressed as a percentage).
Pictures	 
References	Honikel, K. O. 1998. Reference methods for the assessment of physical characteristics of meat. Meat Sci. 49: 447–457 Otto G., Roehe R., Looft H., Thoelking L., Kalm E., 2004. Meat Sci., 68, 401-409.

Ham Drip Loss - Tray

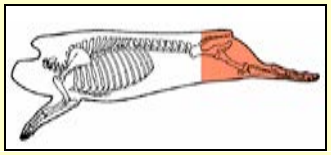
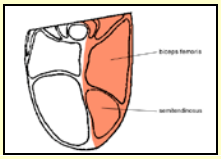
Updated 2012-12-12

Parameters	Description
Name	Ham Drip Loss - Tray
Units	Percent (%)
Category	Objective
Range	0 to 10% (amount of water loss expressed as a fraction of the initial sample weight)
Site	*Biceps femoris*  
Measurement Time	24 hours after slaughter (preparation of samples) – 72 hours after slaughter (measurement)
Blooming	NA
Temperature	Preparation at <10°C ; Storage at 2-4°C
Cautions	
Material	Clean knife, Styrofoam trays (15x15x4cm), absorbent pads (9x15cm), scale, polyvinyl film
Methodology	Sample and weigh a 2 to 2.5 cm sample from the *biceps femoris* muscle. Wrap the sample with oxygen-permeable polyvinyl film on a Styrofoam tray containing an absorbent pad and store for 48 hours at 2 to 4°C. The drip loss is the difference between the original weight and the weight of the sample after 48 hours divided by the original weight (expressed as a percentage). Duplicate measures are recommended when possible.
Pictures	
References	Otto G., Roehe R., Looft H., Thoelking L., Kalm E., 2004. Meat Sci., 68, 401-409.

Factsheet # CMQS-305

Ham Drip Loss - EZ drip

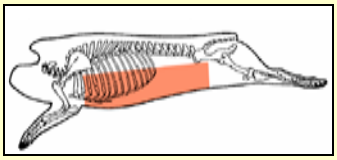
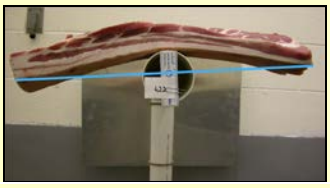
Updated 2012-12-12

Parameters	Description
Name	Ham Drip Loss - EZ Drip
Units	Percentage (%)
Category	Objective
Range	0 -10% (amount of water loss expressed as a fraction of the initial sample weight)
Site	*Biceps femoris*  
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Preparation <10°C ; Storage 4°C
Cautions	
Material	Meat juice collectors, reference 86.290, SARSTEDT company, scale (precision 0.01g), pliers or tweezers, numbered stickers, absorbent paper, sampling corer (25mm diameter), tube holder
Methodology	Prepare a 25-mm thick slice from the *biceps femoris* muscle, to be cut perpendicularly to muscle fiber direction. Before sampling, prepare the numbered tubes and weigh each of them (empty weight). Prepare two meat samples from the ham sample, using a 25-mm cork borer, cutting in the meat fiber direction. The samples are cylindrical, 25 mm in diameter and 25 mm in thickness. Put each sample in a meat juice collector and store vertically at 2 to 4°C. After 48 hours, weigh each tube with the sample inside, then carefully remove sample with tweezers, dry with absorbent paper and weigh each meat sample. The drip loss is the difference between the original weight and the weight of the sample after 48 hours divided by the original weight (expressed as a percentage).
Pictures	
References	Mérour, I., L. Riendeau, L. Maignel, J. Rivest, and A. Vautier. 2007. Journées de la Recherche Porcine 39:215-222. Rassmussen, A.J., and Andersson, M., 1996. In *Proceedings 42nd International Congress of Meat Science and Technology*, Lillehammer (pp. 286 – 287) Otto G., Roehe R., Looft H., Thoelking L., Kalm E., 2004. Meat Sci., 68, 401-409. SARSTEDT website: www.sarstedt.com

Factsheet # CMQS-401

Belly Firmness – 'Flop test'

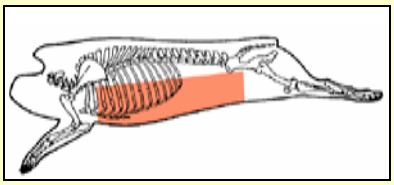
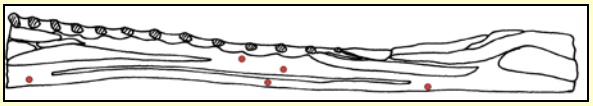
Updated 2012-12-12

Parameters	Description
Name	Belly Firmness - 'Flop test'
Units	Centimeters (cm)
Category	Objective
Range	50-250 (lower values indicate softer bellies, higher values firmer bellies)
Site	
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C ; Meat temperature 0 to 4°C
Cautions	This measurement should be made on bellies not handled extensively prior to measurement, so that they have not been softened by excessive manipulation
Material	Belly holder, ruler, chronometer, scale, digital thermometer
Methodology	To be recorded on a deboned, trimmed, skin-on belly. Hang the belly, skin down over a rod or pipe with the dorsal part towards the operator. After 2 minutes, measure the distance between both sides of the belly, at 15 cm below the top bar. Record belly temperature if possible.
Pictures	  
References	Rentfrow, G., T. E. Sauber, G. L. Allee, and E. P. Berg. 2003. Meat Sci., 64:459–466. Apple J, 2010. AMSA.

Factsheet # CMQS-402

Belly Firmness - Durometer

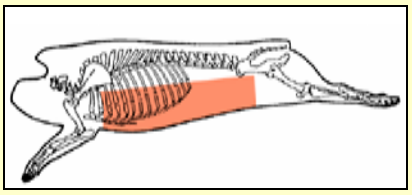
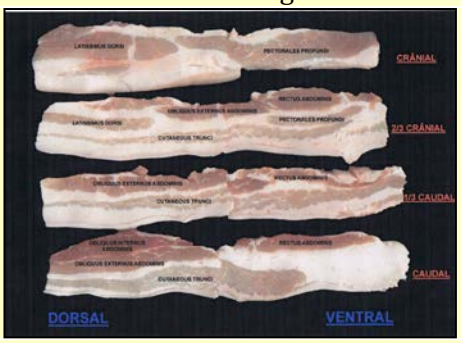
Updated 2012-12-12

Parameters	Description
Name	Belly Firmness - Durometer
Units	
Category	Objective - Reference
Range	0 - 100
Site	 
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C ; Meat temperature 0 to 4°C
Cautions	
Material	Clean knife, digital durometer (ex: Rex SP-590, ASTM D2240), type OO or OOO, fitted with a large base
Methodology	The durometer must be calibrated regularly using a firm surface (value 100) and rubber calibration blocks. Choose an area that is 1) large enough to ensure that the foot of the durometer rests squarely on the sample, 2) wide enough to accommodate the full size of the compression tip, 3) thick enough that the material behind the sampling area does not affect the reading (eg. lean, a strong membrane, or a table). The foot and ball or pin of the durometer must be cleaned after each reading in order to avoid fluid or fat from affecting the readings.
Pictures	 
References	www.rexgauge.com Rincker, P.J., Killerfer, J. and F.K. McKeith. 2007. Meat Science, 77: 213-219

Factsheet # CMQS-403

Belly Conductivity

Updated 2012-12-12

Parameters	Description
Name	Belly Conductivity
Units	
Category	Objective
Range	
Site	
Measurement Time	24 hours after slaughter
Blooming	NA
Temperature	Room temperature <10°C ; Meat temperature 0 to 4°C
Conditions	It is important to work on a surface that does not conduct electricity
Material	Conductimeter (YSI scientific, model 34, with 2 electrodes linked by a plastic box; reading frequency: 1.7477 MHz or equivalent)
Detailed Methodology	To be performed on a deboned belly. Calibrate and choose the right scale on the conductimeter. Measure conductivity on the cranial side (*latissimus dorsi* (site 1), on the *pectorales profundi* muscle (site 2) and on the caudal side (*cutaneous trunci* muscle (site 3)). For each measure, insert electrodes and wait for 2-3 seconds before reading.
Pictures	 
References	