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COMMISSION DECISION

of 19 December 2008

authorising methods for grading pig carcases in Spain

(notified under document number C(2008) 8477)

(Only the Spanish text is authentic)

(2009/11/EC)

(OJ L 6, 10.1.2009, p. 79)

Amended by:

		Official Journal		
		No	page	date
►**M1**	Commission Implementing Decision 2012/384/EU of 12 July 2012	L 186	32	14.7.2012
►**M2**	Commission Implementing Decision (EU) 2018/114 of 16 January 2018	L 20	11	25.1.2018
►**M3**	Commission Implementing Decision (EU) 2018/1521 of 10 October 2018	L 256	84	12.10.2018
►**M4**	Commission Implementing Decision (EU) 2020/113 of 23 January 2020	L 21	16	27.1.2020

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Article 1

The use of the following methods is authorised for grading pig carcasses pursuant to point 1 of Section B.IV of Annex IV to Regulation (EU) No 1308/2013 of the European Parliament and of the Council ([1]) in Spain:

(a) the 'Fat-O-Meat'er (FOM)' apparatus and the assessment methods related thereto, details of which are given in Part 1 of the Annex;

(b) the 'Fully automatic ultrasonic carcase grading (Autofom)' apparatus and the assessment methods related thereto, details of which are given in Part 2 of the Annex;

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(d) the 'Automatic vision system (VCS2000)' apparatus and the assessment methods related thereto, details of which are given in Part 4 of the Annex;

(e) the 'Fat-O-Meat'er II (FOM II)' apparatus and the assessment methods related thereto, details of which are given in Part 5 of the Annex;

(f) the 'AutoFOM III' apparatus and the assessment methods related thereto, details of which are given in Part 6 of the Annex;

(g) the 'manual method (ZP)' with a ruler and the assessment methods related thereto, details of which are given in Part 7 of the Annex;

(h) the 'CSB-Image-Meater' apparatus and the assessment methods related thereto, details of which are given in Part 8 of the Annex;

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(i) the 'gmSCAN' apparatus and the assessment methods related thereto, details of which are given in Part 9 of the Annex;

(j) the 'OptiScan TP' apparatus and the assessment methods related thereto, details of which are given in Part 10 of the Annex.

The manual method ZP with a ruler, referred to in point (g) of the first paragraph, shall only be authorised for abattoirs:

(a) where the number of slaughters does not exceed 700 pigs per week on yearly average basis; and

(b) having a slaughter line with a capacity to process no more than 50 pigs per hour.

([1]) Regulation (EU) No 1308/2013 of the European Parliament and of the Council of 17 December 2013 establishing a common organisation of the markets in agricultural products and repealing Council Regulations (EEC) No 922/72, (EEC) No 234/79, (EC) No 1037/2001 and (EC) No 1234/2007 (OJ L 347, 20.12.2013, p. 671).

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Article 2

By way of derogation from Article 2 of Regulation (EEC) No 3220/84, pig carcases may be presented also without forefeet before being weighed and graded. In this case, in order to establish quotations for pig carcases on a comparable basis, the recorded hot weight shall be increased by 0,840 kilograms.

Article 3

Modifications of the apparatus or the assessment methods shall not be authorised.

Article 4

Decision 88/479/EEC is repealed.

Article 5

This Decision is addressed to the Kingdom of Spain.

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ANNEX

METHODS FOR GRADING PIG CARCASES IN SPAIN

Part 1

FAT-O-MEATER (FOM)

1. Grading of pig carcases shall be carried out by means of the apparatus termed 'Fat-O-Meater (FOM)'.

2. The apparatus shall be equipped with a probe of 6-millimetre diameter containing a photodiode of the Siemens SFH 950 type and a photodetector (type SFH 960), having an operating distance of between 3 and 103 millimetres. The results of the measurements are converted into estimated lean meat content by means of a computer.

3. The lean meat content of the carcase shall be calculated according to the following formula:

$$\hat{Y} = 66{,}91 - 0{,}895\ X1 + 0{,}144\ X2$$

where:

$\hat{Y}$ = the estimated lean meat content (in percentage),

X1 = the thickness of the fat between the third and fourth last rib at 60 mm of the midline of the carcase (in millimetres),

X2 = the thickness of muscle measured at the same time and in the same place as X1 (in millimetres).

This formula shall be valid for carcases weighing between 60 and 120 kilograms.

Part 2

FULLY AUTOMATIC ULTRASONIC CARCASE GRADING (AUTOFOM)

1. Pig carcase grading shall be carried out using the apparatus termed 'Fully automatic ultrasonic carcase grading (Autofom)'.

2. The apparatus shall be equipped with sixteen 2 MHz ultrasonic transducers (Krautkrämer, SFK 2 NP), with an operating distance between transducers of 25 mm.

   The ultrasonic data shall comprise measurements of back fat thickness and muscle thickness.

   The results of the measurements are converted into estimated lean meat content using a computer.

3. The carcase's lean meat content shall be calculated on the basis of 34 measurement points using the following formula:

$$\hat{Y} = 70{,}59614 - 0{,}0904 \cdot V22 - 0{,}23033 \cdot V23 - 0{,}15558 \cdot V44 + 0{,}086638 \cdot V46 - 0{,}09965 \cdot V48 - 0{,}10002 \cdot V49 - 0{,}11624 \cdot V51 - 0{,}05561 \cdot V52 - 0{,}04854 \cdot V53 - 0{,}0432 \cdot V54 - 0{,}00282 \cdot V55 + 0{,}051829 \cdot V57 + 0{,}036795 \cdot V58 - 0{,}00519 \cdot V59 - 0{,}0269 \cdot V60 - 0{,}06432 \cdot V61 - 0{,}05323 \cdot V62 - 0{,}05229 \cdot V64 - 0{,}0523 \cdot V65 + 0{,}005645 \cdot V72 - 0{,}06505 \cdot V73 - 0{,}04587 \cdot V74 + 0{,}015041 \cdot V77 + 0{,}030928 \cdot V78 - 0{,}08024 \cdot V79 - 0{,}07275 \cdot V80 - 0{,}07497 \cdot V85 - 0{,}06818 \cdot V86 - 0{,}06875 \cdot V87 - 0{,}04742 \cdot V90 - 0{,}00698 \cdot V91 + 0{,}046485 \cdot V92 - 0{,}10403 \cdot V93 + 0{,}160475 \cdot V123$$

where:

$\hat{Y}$ = the estimated lean meat content of the carcase,

V22, V23, … V123 are the variables measured with the Autofom.

4. Descriptions of the measurement points and the statistical method can be found in Part II of the Spanish protocol forwarded to the Commission in accordance with Article 3(3) of Regulation (EEC) No 2967/85.

   This formula shall be valid for carcases weighing between 60 and 120 kilograms.

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Part 4

AUTOMATIC VISION SYSTEM (VCS2000)

1. Grading of pig carcases is carried out by means of the apparatus termed 'Automatic vision system (VCS2000)'.

2. The apparatus VCS 2000 is a picture-processing system for automatically determining the trade values of pork carcase halves. The system is used online within the slaughtering production system where via a camera system the carcase halves are automatically filmed. The picture data is then processed in a computer by special picture processing software.

3. The lean meat content of the carcases shall be calculated on the basis of 70 measurement points according to the following formula:

$$\hat{Y} = 37{,}49855 + 0{,}017715 \cdot X_2 - 0{,}00075 \cdot X_{40} - 0{,}02522 \cdot X_{50} - 0{,}04549 \cdot X_{52} - 0{,}0000335 \cdot X_{59} - 0{,}000093 \cdot X_{62} - 0{,}0000814 \cdot X_{63} - 0{,}0000715 \cdot X_{64} - 0{,}0000494 \cdot X_{66} - 0{,}0000482 \cdot X_{67} - 0{,}00047 \cdot X_{69} + 0{,}000304 \cdot X_{70} + 0{,}00867 \cdot X_{77} - 0{,}03007 \cdot X_{79} - 0{,}04575 \cdot X_{81} - 0{,}01742 \cdot X_{82} - 0{,}01768 \cdot X_{83} - 0{,}03114 \cdot X_{84} - 0{,}02549 \cdot X_{85} - 0{,}0265 \cdot X_{92} - 0{,}03299 \cdot X_{95} - 0{,}02472 \cdot X_{99} - 0{,}0399 \cdot X_{102} + 0{,}020178 \cdot X_{103} - 0{,}04614 \cdot X_{106} + 0{,}012659 \cdot X_{107} + 0{,}012256 \cdot X_{110} + 0{,}015358 \cdot X_{113} - 0{,}23294 \cdot X_{116} + 0{,}010157 \cdot X_{117} - 0{,}07282 \cdot X_{120} + 0{,}126624 \cdot X_{142} + 6{,}052785 \cdot X_{2/6} - 13{,}2893 \cdot X_{14/10} + 7{,}287408 \cdot X_{77/51} - 4{,}09296 \cdot X_{79/51} - 11{,}4326 \cdot X_{81/51} - 1{,}28847 \cdot X_{82/51} - 0{,}57019 \cdot X_{83/51} - 5{,}21869 \cdot X_{84/51} - 2{,}92106 \cdot X_{85/51} + 8{,}274608 \cdot X_{88/51} + 9{,}886478 \cdot X_{91/51} - 0{,}00442 \cdot X_{47/79} - 0{,}04848 \cdot X_{50/79} + 0{,}227913 \cdot X_{54/79} + 2{,}845209 \cdot X_{77/79} + 0{,}018409 \cdot X_{86/79} - 0{,}00838 \cdot X_{89/79} + 0{,}007447 \cdot X_{94/79} + 136{,}5994 \cdot X_{27/20} + 182{,}973 \cdot X_{29/20} - 6{,}82665 \cdot X_{59/20} - 261\,768 \cdot X_{61/20} - 7{,}85416 \cdot X_{62/20} - 3{,}8587 \cdot X_{63/20} - 16{,}6166 \cdot X_{64/20} - 59{,}2087 \cdot X_{65/20} - 3{,}21138 \cdot X_{66/20} - 6{,}96096 \cdot X_{67/20} + 20{,}91982 \cdot X_{68/20} - 109{,}736 \cdot X_{69/20} + 243{,}641 \cdot X_{70/20} + 29{,}84246 \cdot X_{73/20} + 15{,}50442 \cdot X_{74/20} - 0{,}30367 \cdot X_{36/59} - 2{,}07787 \cdot X_{40/59} - 0{,}38605 \cdot X_{42/59} - 1{,}90547 \cdot X_{69/59} + 3{,}554836 \cdot X_{70/59}$$

where:

$\hat{Y}$ = the estimated percentage of lean meat in the carcase,

X_2, X_{40}, … $X_{70/59}$ are the variables measured with the VCS2000.

4. Descriptions of the measurement points and the statistical method can be found in Part II of the Spanish protocol forwarded to the Commission in accordance with Article 3(3) of Regulation (EEC) No 2967/85.

This formula shall be valid for carcases weighing between 60 and 120 kilograms.

▼M4

Part 5

FAT-O-MEAT'ER (FOM II)

1. The rules provided for in this Part shall apply when the grading of pig carcasses is carried out by means of the apparatus known as 'Fat-O-Meat'er (FOM II)'.

2. The apparatus is a new version of the Fat-O-Meat'er measurement system. The FOM II consists of an optical probe with a knife, a depth measurement device having an operating distance of between 0 and 125 millimetres and a data acquisition and analysis board – Carometec Touch Panel i15 computer (Ingress Protection IP69K). The results of the measurements are converted into estimated lean meat content by the FOM II apparatus itself.

3. The lean meat content of a carcass shall be calculated according to the following formula:

$$\hat{Y} = 69{,}592 - (0{,}741 \times X_1) + (0{,}066 \times X_2)$$

▼M4

where:

$\hat{Y}$ = the estimated percentage of lean meat in a carcass;

X1 = the thickness of back-fat (including rind) in millimetres, measured perpendicularly to the back of the carcass at 6 cm of the split line, between the third and fourth last ribs;

X2 = the thickness of the dorsal muscle in millimetres, measured at the same time, in the same place and in the same way as X_1.

This formula shall be valid for carcasses weighing between 60 and 120 kilograms (warm weight).

Part 6

AUTOFOM III

1. The rules provided for in this Part shall apply when the grading of pig carcasses is carried out by means of the apparatus known as 'AutoFOM III'.

2. The apparatus shall be equipped with sixteen 2 MHz ultrasonic transducers (Carometec A/S), with an operating distance between transducers of 25 mm. The ultrasonic data shall comprise measurements of back fat thickness, muscle thickness and related parameters. The results of the measurements are converted into estimates of the percentage of lean meat by using a computer.

3. The lean meat content of a carcass shall be calculated according to the following formula:

$\hat{Y} = 75{,}39088 - (1{,}39968 \times R2P1) - (0{,}45787 \times R2P4) - (0{,}47094 \times R2P10) + (0{,}20349 \times R4P6)$

where:

$\hat{Y}$ = the estimated percentage of lean meat in a carcass,

R2P1 = the average thickness of the skin;

R2P4 = the P2 fat measure at the selected position in mm;

R2P10 = minimum fat of the cross-section in mm;

R4P6 = the fat 1 measurements in the selected MFT point.

This formula is valid for carcasses weighing between 60 and 120 kg (warm weight).

Part 7

MANUAL METHOD (ZP)

1. The rules provided for in this Part shall apply when the grading of pig carcasses is carried out by use of the 'manual method (ZP)' measuring by ruler.

2. This method may be implemented using a ruler, with the grading determined on the basis of the prediction equation. It is based on the manual measurement on the midline of the split carcass of the thickness of the fat and of the thickness of the muscle.

▼M4

3. The lean meat content of carcasses shall be calculated according to the following formula:

$$\hat{Y} = 66{,}324 - (0{,}526 \times F) + (0{,}034 \times M)$$

where:

$\hat{Y}$ = the estimated percentage of lean meat in the carcass,

F = the minimum thickness of visible fat (including rind), in millimetres, on the midline of the split carcass in millimetres, covering the muscle *gluteus medius*,

M = the visible thickness of the lumbar muscle, in millimetres, on the midline of the split carcass, measured as the shortest connection between the front (cranial) end of the muscle *gluteus medius* and the upper (dorsal) edge of the vertebral canal.

This formula shall valid for carcasses weighing between 60 and 120 kg (warm weight).

▼M2

Part 8

CSB-IMAGE-MEATER

1. The rules provided for in this part shall apply when the grading of pig carcasses is carried out by means of the apparatus known as 'CSB-Image-Meater'.

2. The CSB-Image-Meater consists in particular of a video camera, a PC equipped with an image-analysis card, a screen, a printer, a command mechanism, a rate mechanism and interfaces. The 4 CSB-Image-Meater variables are all measured at the split line in the ham area (around *gluteus medius* muscle); the measured values are transformed into estimation of a lean meat percentage by a central unit.

3. The lean meat content of a carcass shall be calculated according to the following formula:

$$\hat{Y} = 68{,}39920953 - (0{,}39050694 \times F) - (0{,}32611391 \times V4F) + (0{,}07864716 \times M) - (0{,}00762296 \times V4M)$$

where:

$\hat{Y}$ = the estimated percentage of lean meat in a carcass,

F = fat thickness as thinnest layer above muscle *gluteus medius* (in millimetres),

V4F = Average fat thickness of the complete bacon layer above the four lumbar vertebra (called VaF, VbF, VcF, VdF) (in millimetres),

M = Meat thickness from the cranial edge of muscle *gluteus medius* and the vertebrae canal (in millimetres),

V4M = Average meat thickness above the four lumbar vertebra (called VaM, VbM, VcM, VdM) (in millimetres).

This formula shall be valid for carcasses weighing between 60 and 120 kilograms (warm weight).

▼M3

Part 9

gmSCAN

1. The rules provided for in this part shall apply when the grading of pig carcasses is carried out by means of the apparatus known as 'gmSCAN'.

▼M3

2. The gmSCAN uses magnetic induction to determine the dielectric properties of the carcasses without contact. The measurement system is formed by a number of transmitter coils that generate a variable and low intensity magnetic field. The receiver coils converts the signal from the perturbation of magnetic field caused by the carcass into a complex electric signal, related to the dielectric parameters of the muscle and fat tissue of the carcass.

3. The lean meat content of a carcass shall be calculated according to the following formula:

$$\hat{Y} = 55{,}14067 + 1\,598{,}66166 \times (Q1/CW) - 579{,}58575 \times (Q2/CW) + 970{,}83879 \times (Q3/CW) - 0{,}18993 \times CW$$

where:

$\hat{Y}$ = the estimated percentage of lean meat in a carcass;

Q1, Q2 and Q3 = Magnetic Induction response (Volts) from the ham, middle and shoulder area, respectively;

CW = warm carcass weight (in kilograms).

This formula shall be valid for carcasses weighing between 60 and 120 kilograms (warm weight).

▼M4

Part 10

OPTISCAN TP

1. The rules provided for in this part shall apply when the grading of pig carcasses is carried out by means of the apparatus known as ‘OptiScan TP’.

2. The OptiScan-TP apparatus shall be equipped with a digital imager taking an illuminated photo of the two measurement points on the carcasses. The images shall be the base for the calculation of fat and muscle thickness. The results of the measurements shall be converted into estimated lean meat content by means of the Optiscan-TP apparatus itself. The photos are saved and can later be controlled. The integrated Bluetooth® interface permits easy data transfer.

3. The lean meat content of a carcass shall be calculated according to the following formula:

$$\hat{Y} = 67{,}496 - (0{,}522 \times F) + (0{,}032 \times M)$$

where:

$\hat{Y}$ = the estimated percentage of lean meat in a carcass;

F = the minimal thickness of visible fat (including rind) in millimetres, on the midline of the split carcass, covering the muscle *gluteus medius;*

M = the visible thickness of the lumbar muscle, in millimetres, on the midline of the split carcass, measured as the shortest connection between the front (cranial) end of the muscle *gluteus medius* and the upper (dorsal) edge of the vertebral canal.

This formula shall be valid for carcasses weighing between 60 and 120 kilograms (warm weight).