

HARMONIZATION OF CRITERIA AND TERMINOLOGY IN RABBIT MEAT RESEARCH. REVISED PROPOSAL

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ABSTRACT : The harmonization of rabbit carcass criteria is a result of an international work. Its task was to specify the main traits to be considered from the birth of the animal to the carcass analysis, to define these traits with enough accuracy and to propose a common terminology. The work concerns: 1- growth, consumption and breeding measurements,

preslaughter handling and slaughter processing, 2- dressing out percentage analysis, 3- measurements or prediction of chilled and reference carcass composition. The proposal described in this work updates the former proposal published in 1993, and has the status of official document of the WRSA.

RESUME : *Harmonisation des critères et de la terminologie dans les recherches sur la viande de lapin. Version révisée.*

L'harmonisation des critères d'étude de la carcasse du lapin est le résultat d'un travail international. Son objectif est de définir, avec une précision suffisante, les caractères qui décrivent au mieux l'animal, de la naissance à l'analyse de la

carcasse, et de proposer une terminologie commune. Ce travail concerne: 1- les critères de croissance, de consommation et d'élevage, les traitements *peri mortem*, 2- l'analyse du rendement à l'abattage, 3- les mesures ou les prédictions de la composition des carcasses réfrigérée et de référence. Le présent texte remplace celui qui a été publié en 1993. Il a le statut de document officiel de la WRSA.

INTRODUCTION

A proposal for harmonization of criteria and terminology in rabbit meat research was presented in the 5th Congress of the World Rabbit Scientific Association (WRSA). After discussion, the paper was modified including some proposals of the Congress and published as an official document of the WRSA (BLASCO *et al.*, 1993). A Commission was created by the WRSA to examine the efficiency of the proposed criteria and to modify them according to what the scientific development and the practical experience of their use would recommend. This Commission had a meeting at Kaposvar (Hungary) in 1994 and proposed new modifications. These modifications do not affect the body of the former proposal, but improve the accuracy of some definitions and suggest some new traits to be easily measured.

MODIFICATIONS TO THE FORMER CRITERIA

- **Reference Body Weight.** The definition of Reference Body Weight included the recommendation of weighing the females 7 days after parturition. Now, it is only recommended to weigh them at the same

physiological status. Nevertheless, if no other preference is established by the researcher, 7 days after parturition could still be a common reference point.

- **Commercial Carcass Weight.** It is now named **Chilled Carcass Weight**. Consequently, the definitions of Drip Loss Percentage, Dressing out Percentage and Reference Carcass Weight are modified.

- **Dressing Percentage** is now named **Dressing out Percentage**.

- **Total Muscle Weight.** It is now named **Total Meat Weight**, since meat contains not only muscle but connective tissue, portions of non-dissectible fat and tendons.

- **Lean content.** It is now named **Meat Percentage (MP)**.

- **Hind Leg Weight** of the technological joints is now named **Hind Part Weight (HPW)**, since it is the same cut as in the anatomical division.

NEW DEFINITIONS

- **Dissectible Fat Weight (DFW).** Weight of the scapular, inguinal and perirenal deposits.

- **Inguinal Fat Weight (IFW).** Weight of the fat deposits located in the inguinal area and at the bottom of the external abdominal wall.

- **Total Bone Weight (TBW).** Weight of the Reference Carcass minus Dissectible Fat and Dissectible Meat. Total Bone Weight includes cartilage and small portions of meat between vertebrae, ribs, kneecaps and other parts not easily removable by dissection. Analogous definition holds for bone in retail cuts.

- **Total Meat Weight (TMW).** Weight of the Reference Carcass minus Dissectible Fat Weight and Bone Weight. Total Meat Weight includes intermuscular fat and tendons. Analogous definition holds for meat in retail cuts.

HARMONIZATION OF CRITERIA AND TERMINOLOGY

Although the proposal concerns carcass traits, some recommendations for growth, consumption and breeding measurements or definition are given in the first part.

Generally, *it is recommended* to use abbreviations ending by a **W** for ponderable traits, by a **P** for percentage traits and by a **L** for length traits.

1. Breeding conditions and standard measurements on live animals

Age at weaning.

The birth of rabbits, even in a planned experiment, takes place within a 2 to 3 day period. However, rabbits are usually weaned on a fixed day of the week. *It is recommended* to specify the number of days between the average day of birth and the day of weaning.

Type of weaning.

It is recommended to explain how weaning is carried out: taking the mother away, putting the litter in another cage, mixing litters in a cage with a fixed number of rabbits, or otherwise.

Growing period.

If the growing period is time-fixed, *it is recommended* to give the number of days from weaning to slaughter.

Rabbit density.

It is recommended to specify the number of rabbits per square metre at the beginning of the fattening period.

Criteria of elimination.

It is recommended to describe the criteria used to consider an animal as a runt at birth, weaning or during

the fattening period and then to exclude it from the experiment.

Type of feeding.

In many experiments it is important to know whether the animals are fed *ad libitum* or restricted, and in the latter case what kind of restriction. It can also be important to determine whether the food is commercial, standard, or home prepared. In both cases *it is recommended* to indicate the diet formulation. It is essential in experiments about nutrition research.

Liveweight (LW) (i.e. LW70 = liveweight at 70 days)

** Standardized Liveweight.*

Liveweight of rabbits at the end of the experimental period. If this period ends at fixed weight, the weight interval has to be given. *It is recommended* to measure standardized liveweight before fasting or other treatments. Digestive tract content and urinary bladder have to be included, even in studies on body composition (BUTTERFIELD, 1988).

** Other Liveweights.*

If another weight is used as "liveweight" (i.e. slaughter weight after fasting, empty body weight,...), *it is recommended* to describe it clearly.

Fasting.

Fasting can be from solids, liquids or both. *It is recommended* to specify the type of fasting and its duration.

Transport to the slaughter house.

Slaughter yield and meat quality can be affected by stress or weariness due to transport. *It is thus recommended* to indicate the duration of the transport from the farm to the slaughter house and, eventually, the resting period before slaughter.

Type of slaughter shock.

In many countries there are legal norms about slaughter shock to prevent animals from suffering. *It is recommended* to describe the type of shock: electrical (voltage and duration), neck hit or others.

Reference Body Weight (RBW).

It is not easy to determine the adult weight. The following points have to be specified: 1- the genetic origin of the animals; 2- the sex (sexual dimorphism can occur at the adult age); 3- the type of feeding (*ad libitum* or restricted, type of food, ...); 4- the season of the experiment; 5- the physiological status of the does (lactation, pregnancy, ...); 6- other factors (special diets, hormonal treatments, ...). TAYLOR (1985) gives a complete definition of mature body weight: "... weight of a normally grown, skeletally mature, normally active adult animal maintained in a state of body

weight equilibrium on a standard diet, in a thermoneutral, disease-free environment with, or adjusted to, a chemical body fat of 20 %". As a reasonable approximation, it is recommended to measure liveweight several times (at least four times) at fixed time intervals (i.e. 30 days). If the four measurements do not show any increase, the average can be considered as a "reference body weight", similar to the adult weight in many cases. During the reproductive life of females, it is recommended to weigh females at the same physiological status. This status should be clearly determined. If no other preference is established by the researcher, 7 days after parturition could be a common reference, as recommended by COUDERT and LEBAS (1985).

2. Standard measurements on rabbit meat and carcasses

2.1 Slaughtering data

Commercial Skin Weight (CSkW).

The skin is separated from the head and the body by cutting at the level of the third caudal vertebra and of the distal epiphyses of *radius-ulna* and tibia bones. The skin weight includes the weight of the ears, of the distal part of the tail, but excludes the distal part of fore and hind legs. It also includes the weight of some hypodermic fat but excludes scapular fat deposits.

Full Gastrointestinal Tract Weight (FGTW).

The full tract weight includes the stomach, caecum and intestinal contents, and the urogenital tract with empty urinary bladder.

Empty Gastrointestinal Tract Weight (EGTW).

Weight of the clean and dripped tract.

Hot Carcass Weight (HCW).

Weight of the carcass 15-30 min after slaughter.

The carcass does not include blood, skin, distal parts of the tail, fore and hind legs, gastrointestinal and urogenital tracts. It includes head, liver, kidneys and the organs located in the thorax and neck (lungs, oesophagus, trachea, thymus and heart). Hind leg section in the middle of the tarsus has the advantage to permit the carcass to be hung by the hind legs for further processing. However, it is recommended to cut the hind leg between the distal epiphyses of the *tibia* and *tarsus-calcaneus*.

Chilled Carcass Weight (CCW).

Weight of the above carcass after chilling for 24 hours in a ventilated cold room (0-4°C) about one hour after slaughter. Washing carcass (i.e. with water) is to avoid. It is recommended to hang the carcass during chilling with sufficient air around it.

Drip Loss Percentage (DLP).

Difference between Hot Carcass Weight and Chilled Carcass Weight divided by Hot Carcass Weight ($\times 100$).

Dressing out Percentage (DoP).

Chilled Carcass Weight divided by Liveweight ($\times 100$). If hot carcass weight or other carcass weights are used, it is recommended to describe the Dressing out Percentage used clearly. The elimination of the head, for example, has to be made as described further.

2.2. Prediction of carcass composition

Total meat weight.

Chilled Carcass Weight gives a good prediction for the total meat carcass weight, the determination coefficient of the prediction equation (R^2) being near 0.9 (BLASCO *et al.*, 1984).

Meat percentage.

Meat content is the most important criterion of carcass classification in pig, cattle or sheep. This criterion is not as important in rabbit because this animal is very lean compared with the other farm animals (less than 5 % of fat in the carcass). As a consequence, the variability of rabbit meat content is much lower than in other species. Carcass weight, length measurements, length ratios, retail cut weights or hind leg meat are bad predictors of the meat percentage of the carcass. Some combinations of these measurements in regression equations are, nevertheless, fairly good predictors (Blasco *et al.*, 1984).

Meat to bone ratio of the carcass.

The meat to bone ratio of the hind leg gives a fairly good prediction of the meat to bone ratio of the carcass ($R^2 = 0.6$) (VAREWYCK and BOUQUET, 1982 ; BLASCO *et al.*, 1984). Other carcass measurements give poor predictions of this ratio. The meat to bone ratio of the hind leg can be predicted by the same ratio of the cooked hind leg ($R^2 = 0.7$) when cooking conditions are standardized (under vacuum, 80°C, 2 hr 30) (OUHAYOUN *et al.*, 1986).

Total dissectible fat.

The percentage of perirenal fat is a reasonable predictor of the percentage of dissectible fat in the whole carcass ($R^2 = 0.8$) (VAREWYCK and BOUQUET, 1982).

2.3. Chilled carcass composition

Liver Weight (LvW).

Weight of the liver, excluding gall bladder.

Figure 1 : Linear measurements

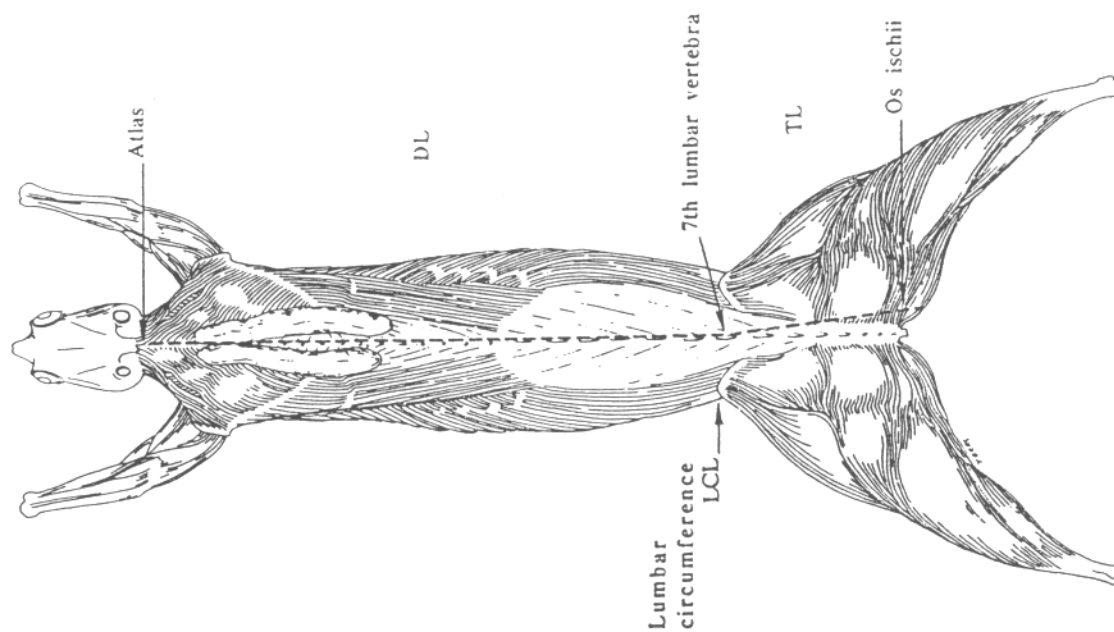


Figure 2 : Carcass division
Anatomical division : cutpoints 2 and 3
Technological division : cutpoints 1, 3 and 4

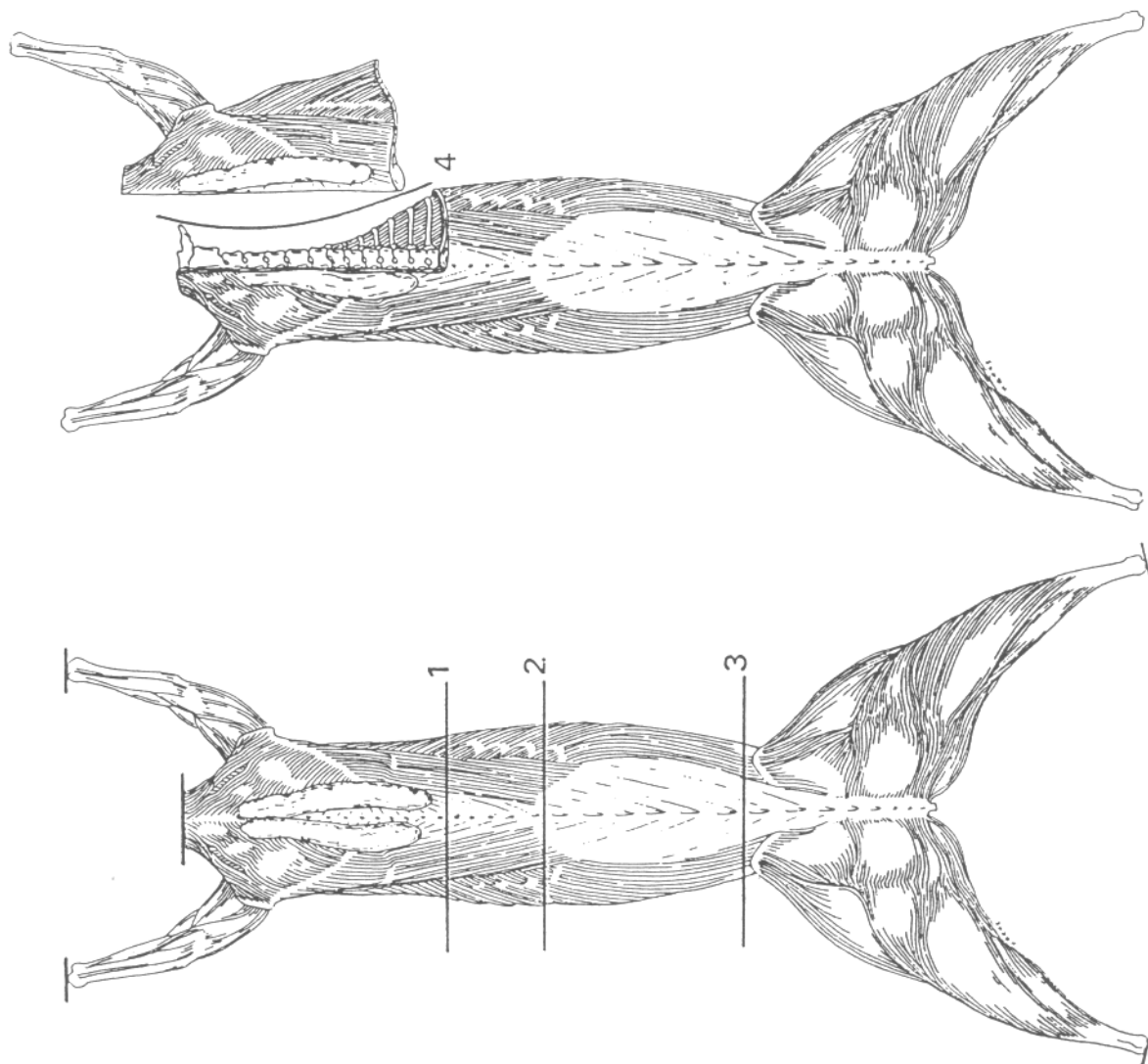


Figure 3 : Hindleg separation (cutpoint 5)

Dorsal view



Ventral view



Kidney Weight (KiW).

Weight of both kidneys without perirenal fat deposits.

Thymus, Trachea, Oesophagus, Lung and Heart Weight (LHW).

Weight of these organs.

Reference Carcass Weight (RCW).

Weight of the Chilled Carcass minus the head and the above mentioned organs (liver, kidney, organs of chest and neck).

2.4. Reference carcass characteristics

Perirenal Fat Weight (PFaW).

Weight of perirenal fat deposits located between carcass cutpoints 1 and 3 (see further).

Scapular Fat Weight (SFaW).

Weight of both scapular fat deposits.

Inguinal Fat Weight (IFaW).

Weight of the fat located in the inguinal area and at the bottom of the external abdominal wall.

Dissectible Fat Weight (DFaW).

Weight of the scapular, inguinal and perirenal fat deposits.

Total Bone Weight (BW).

Weight of the reference carcass minus Dissectible Fat Weight and Dissectible Meat Weight. Total Bone Weight includes cartilage and small portions of meat between vertebrae, ribs, kneecaps and other parts not easily removable by dissection. Analogous definition holds for bone in retail cuts.

Total Meat Weight (MW).

Weight of the reference carcass minus Dissectible Fat Weight and Total Bone Weight. Total Meat Weight includes intermuscular fat and tendons. Analogous definition holds for meat in retail cuts.

Linear measurements (figure 1)

* Dorsal Length (DL). Interval between the atlas vertebra and the 7th lumbar vertebra.

* Thigh Length (TL). Interval between the 7th lumbar vertebra and the distal part of os ischii.

* Lumbar Circumference (LCL). Carcass circumference at the level of the 7th lumbar vertebra.

Carcass Division (figures 2 and 3)

From a commercial point of view, the carcass has to be divided into joints intended to be sold for cooking. However, in many scientific papers dealing with relative growth of carcass components and in other carcass studies, a kind of "anatomical" carcass division has been used until now. Both points of view

being somewhat complementary, *it is recommended* to cut the carcass in the following order:

* elimination of the head: section between *occiput* and *atlas vertebra*,

* cutpoint 1: section between the 7th and 8th thoracic vertebra, following the prolongation of the ribs when cutting the thoracic wall,

* cutpoint 2: section between the last thoracic and the first lumbar vertebra, following the prolongation of the 12th rib when cutting the thoracic wall,

* cutpoint 3: section between the 6th and 7th lumbar vertebra, cutting the abdominal wall transversally to the vertebral column,

* cutpoint 4: separation of fore legs, including insertion and thoracic muscles,

* cutpoint 5 : separation of hind legs, including *os coxae* and posterior part of *m. iliopsoas* : *m. psoas major* and *m. iliacus (pars lateralis and pars medialis)*.

These cuts allow to define head, anatomical and technological joints:

Head Weight (HW)

Anatomical joints (cutpoints 2 and 3)

* Fore Part Weight (FPW),

* Intermediate Part Weight (IPW),

* Hind Part Weight (HPW).

Technological joints (cutpoints 1, 3 and 4)

* Fore Leg Weight (FLW),

* Thoracic cage Weight (TW) (without the insertion muscles of fore legs),

* Loin Weight (LW)

* Hind Part Weight (HPW)

The joints can be classified in first retail cuts (hind legs, loin and fore legs) and second retail cuts (limited to thoracic cage).

CONCLUSION

The list of traits given in this paper is not exhaustive, because it is not possible to enumerate the different types of possible experiments. It is not either

realistic, to determine a fixed number of compulsory norms which would limit the scope of research studies. However, if a scientist prefers to use different traits or routines, it would be advisable to specify them as specified here. Even though some traits are not used in some countries, their adoption could favour international exchanges and communication. Some indications constitute general recommendations, some are interesting only in certain experiments or in certain countries, and some of them are highly recommended for all experiments. This list will have to be modified in the future, not only after checking how it works, but also because new developments will take place in the scientific and commercial world.

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LEXICON (English, Spanish, French , Italian)**A**

Age at weaning / edal al destete / âge au sevrage / età allo svezzamento

Anatomical retail cut / descomposición anatómica de la canal / découpe anatomique de la carcasse / dissezione anatomica della carcassa

B

Birth / nacimiento / naissance / nascita

Bladder / vejiga / vessie / vescica

Blood / sangre / sang / sangue

Breed / raza / race / razza

Breeding / crianza / élevage / allevamento

C

Cage / jaula / cage / gabbia

Carcass / canal / carcasse / carcassa

Carcass composition / composición de la canal / composition de la carcasse / composizione della carcassa

Carcass length / longitud de la canal / longueur de la carcasse / lunghezza carcassa

Carcass weight / peso de la canal / poids de la carcasse / peso carcassa

Criteria of elimination / criterios de eliminación / critères d'élimination / Criteri di riforma

D

Dissection / disección / dissection / dissezione

Doe / coneja / lapine / fatrice

Dressing out percentage / rendimiento a la canal / rendement en carcasse / resa alla macellazione

Drip loss / pérdidas de escurrido / perte au ressuage / perdite di raffredamento

E

Empty body weight / peso vivo vacío / poids vif vide / peso vivo vuoto

F

Fasting / ayuno / jeûne / digiuno

Fat percentage / porcentaje de grasa / pourcentage de gras / percentuale di grasso

Fattening / engorde / engraissement / ingrasso

Feed / pienso / aliment / alimento

Feeding (ad libitum, restricted) / alimentación (ad libitum, restringida) / alimentation (ad libitum, restreinte) / alimentazione (ad libitum, razionata)

Fore part of the carcass / parte anterior de la canal / avant de la carcasse / anteriore

Forelegs / patas delanteras / membres antérieurs / arti anteriori

G

Gall bladder / vesícula biliar / vésicule biliaire / vescicola biliare

Gastrointestinal tract (full, empty) / tracto digestivo (lleno, vacío) / tractus digestif (plein, vide) / visceri (pieni, vuote)

Growing period / periodo de crecimiento / période de croissance / periodo d'accrescimento

Growth rate / velocidad de crecimiento / vitesse de croissance / velocità d'accrescimento

H

Head / cabeza / tête / testa

Hind part of the carcass / parte posterior de la canal / arrière de la carcasse / posteriori

Hindlegs / patas traseras / membres postérieurs / arti posteriori

Hot carcass / canal caliente / carcasse chaude / carcassa calda

I

Inguinal fat / grasa inguinal / gras inguinal / grasso inguinale

Interiliac circumference / circunferencia interiliaca / circonférence interiliaque / circonferenza lombare

Intermediate part of the carcass / lomo / râble de la carcasse / lombata

K

Kidneys / riñones / reins / reni

L

Lactation / lactación / lactation / lattazione

Meat percentage / porcentaje de carne / pourcentage de viande / percentuale di carne

Liver / hígado / foie / fegato

Liveweight / peso vivo / poids vif / peso vivo

M

Meat / carne / viande / carne

Meat to bone ratio / relación músculo-hueso / rapport muscle-os / rapporto carne-osso

N

Neck / cuello / cou / collo

P

Perirenal fat / grasa perirenal / gras périrénal / grasso perirenale

Pregnancy / gestación / gestation / gestazione

R

Rabbit / conejo / lapin / coniglio

Rabbit density (per cage, m²) / densidad de conejos (por jaula, m²) / densité (lapins par cage, m²) / densità (conigli per gabbia, m²)

Reference body weight / peso de referencia / poids de référence / peso di riferimento

Reference carcass / canal de referencia / carcasse de référence / carcassa di riferimento

Retail cuts (of the carcass) / troceado (de la canal) / morceaux de découpe (de carcasse) / tagli commerciali

S

Scapular fat / grasa interescapular / gras scapulaire / grasso scapolare

Skin / piel / peau / pelle

Slaughter liveweight / peso vivo al sacrificio / poids vif à l'abattage / peso vivo di macellazione

Slaughter weight / peso al sacrificio / poids à l'abattage / peso di macellazione

Slaughtering / sacrificio / abattage / macellazione

Standardized liveweight / peso vivo estándar / poids vif standard / peso vivo standard

Stunning / aturdir / étourdissement / stordimento

T

Technological retail cut / troceado tecnológico de la canal / découpe technologique de la carcasse / tagli commerciali

Total dissectible fat / grasa total disecable / gras dissécable total / totale grasso separabile

Trachea + Thymus + Heart + Lungs / tráquea + timo + corazón + pulmón / trachée + thymus + coeur + poumons / trachea + timo + cuore + polmoni

W

Weaning / destete / sevrage / svezzamento

Whole carcass / canal completa / carcasse entière / carcassa intera