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**COMMISSION STAFF WORKING DOCUMENT**

**on best practices with a view to the prevention of routine tail-docking and the provision of enrichment materials to pigs**

*Accompanying the document*

**COMMISSION RECOMMENDATION**

**on the application of Council Directive 2008/120/EC laying down minimum standards for the protection of pigs as regards measures to reduce the need for tail-docking**

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## 1. BACKGROUND

The EU Directive on the protection of pigs<sup>1</sup> requires that:

*"pigs must have permanent access to a sufficient quantity of material to enable proper investigation and manipulation activities, such as straw, hay, wood, sawdust, mushroom compost, peat or a mixture of such, which does not compromise the health of the animals."*

*"Neither tail-docking nor reduction of corner teeth must be carried out routinely but only where there is evidence that injuries to sows' teats or to other pigs' ears or tails have occurred. Before carrying out these procedures, other measures shall be taken to prevent tail-biting and other vices, taking into account environment and stocking densities. For this reason inadequate environmental conditions or management systems must be changed."*

*"Member States shall ensure that, without prejudice to the requirements laid down in Annex I, sows and gilts have permanent access to manipulable material at least complying with the relevant requirements of that Annex".<sup>2</sup>*

The implementation of these particular requirements of the Directive has been the subject of several meetings organised by the Commission since 2013 with Member States, the main organisations involved in pig farming, main scientists and experts from the sector. Representatives from civil society including veterinary and animal welfare organisations have contributed to the work. A detailed list of the meetings and the main stakeholders that contributed are presented in Annex III of this document. In addition to the meetings the consultation process included collaborative electronic drafting and bilateral meetings.

The Commission has adopted a Recommendation on the application of Council Directive 2008/120/EC laying down minimum standards for the protection of pigs as regards measures to reduce the need for tail-docking.

In accordance with that Commission Recommendation, this document suggests best practices to reduce the need for tail-docking in different husbandry systems. It also gives an overview of the various factors contributing to tail-biting.

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<sup>1</sup> Paragraphs 4 and 8 of Chapter I of Annex I to Council Directive 2008/120/EC of 18 December 2008 laying down minimum standards for the protection of pigs (OJ L 47, 18.2.2009, p. 5).

<sup>2</sup> Article 3(5) of Council Directive 2008/120/EC.

It will encourage choosing the enrichment materials most suitable to the production circumstances (type of farm, climatic conditions, materials available, economic impact...).

This document will be updated as scientific evidence evolves. It is without any legally binding nature. It is drafted by the Commission services as a staff working document and does not reflect any validated position of the Commission.

## **2. WHY DO PIGS BITE OTHERS' TAILS?**

Pigs have a natural tendency to perform exploratory and foraging behaviour for many reasons: searching for food, looking for bedding materials, finding a place to lie down or simple curiosity about their living area.

Exploratory and foraging behaviour is innate. Pigs need to perform it at a very young age even if they are provided with enough feed to satisfy their dietary needs. When these needs are not met, a range of adverse consequences results.

**Tail-biting is an abnormal behaviour<sup>3</sup>**, characterized by one pig's dental manipulation of another pig's tail. It is a response to boredom, insufficient stimulation and frustration in association with other negative environmental and management factors that can increase pigs' stress levels.

This aberrant aggressive behaviour can also take the form of ear, flank or even vulval or penis biting. However, tail-biting is the most widespread and serious of these problems.

**Tail-biting has a multi-factorial origin** and there is scientific evidence that some causal factors have more weight. However, the 'overflowing bucket' model can be usefully used to describe this aberrant behaviour. This shows how an accumulation of risk factors can lead to tail-biting and how the risk factor, which acts as the trigger, is not necessarily the one which presents the greatest individual risk.

Although the exact triggering mechanism remains elusive, a wide range of environmental, dietary and husbandry factors have been identified as risks for tail-biting. These hazards range from lack of adequate enrichment material, high stocking densities, competition for feed/water, inadequate diet (deficiencies of sodium or essential amino-acids) to poor health status, climate and ventilation conditions, animal characteristics (breed, genetics, gender) or social environment (herd size, mixing animals).

## **3. WHEN DOES TAIL-BITING AFFECT PIGS WELFARE?**

Tail-biting typically occurs after a period of pre-injury tail chewing, in which gentle non-injurious chewing of the tail occurs, often when pigs are resting. For pigs with intact tail, such non-injurious biting may be noticed due to the low altered tail posture. Furthermore, tail hair may be missing at this stage. This is then followed by a damaging stage - biting is more

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<sup>3</sup> Scientific Opinion of the Panel on Animal Health and Welfare on a request from Commission on the risks associated with tail biting in pigs and possible means to reduce the need for tail docking considering the different housing and husbandry systems. The EFSA Journal (2007) 611, 1-13




forceful, blood is present from wounded tails and the behaviour escalates within the group. Once a tail is bitten, the injured pig becomes more active from discomfort and pain. The increase in activity and the taste of blood may attract more biting and more pigs to bite tails. The stockperson will usually become aware of the problem at this stage. Later on, the severely injured pig will become apathetic, lie down much of the time, seldom change its position and react only slightly to being bitten.

Tail-biting incidents also occur when tails are docked, therefore docking as such does not solve the tail-biting problem. Nevertheless, the first stages of the process in tail-docked pigs are unlikely to be picked up by the passing observations of the stock person.

Tail-biting may be seen in different scenarios starting from a constant low-grade problem in a production unit to explosive outbreaks in batches. As such, the incidence is highly variable depending on the management of the production site.

Prior to any changes in management practices, the presence of tail-biting may be assessed by using the following scoring system<sup>4</sup>.

Tail-biting, as a parameter related to damage of the tail, may be ranged from superficial bites along the length of the tail to absence of the tail. Score 2, as shown below, seriously compromises pig welfare.

Score 0	Score 1	Score 2
		
No evidence of tail-biting	Indication of superficial biting along the length of the tail, but no evidence of fresh blood or of any swelling (red areas on the tail are not considered as wounds unless associated with fresh blood)	Fresh blood is visible on the tail and/or there is evidence of some swelling and infection and/or part of the tail tissue is missing and a crust has formed

#### 4. WHY SHOULD WE BOTHER ABOUT TAIL-BITING?

Despite this primary outcome of the unnecessary pain suffered and frustration felt by the animal, this aggressive behaviour leads also to important economic impacts in the pig industry. Tail lesions not only increase the risk of carcasses being condemned and trimmed, primarily because of abscessation, they are also associated with lower carcass weights.

<sup>4</sup> Welfare Quality Protocol, 2009 (<http://www.welfarequality.net>)

## 5. HOW TO PREVENT TAIL-BITING?

Tail-biting may not be completely eradicated, but risks can be considerably reduced if correct management measures are introduced, such as:

- supplying appropriate enrichment materials, and
- providing other management measures such as e.g. appropriate environmental conditions, good health status or balanced diet.

It is therefore advisable to monitor the risk factors, by keeping detailed records of the husbandry conditions of the pigs as well as any findings that may trigger an episode of tail-biting. This may help in identifying the underlying cause of the problem and measuring how effective, in the case of an outbreak, the measures put in place are.

## 6. ENRICHMENT MATERIALS<sup>5</sup>

Providing a sufficient quantity of suitable materials is necessary to **enable pigs to fulfil their innate needs to look for food (*edible materials*), bite (*chewable materials*), root (*investigable materials*) and manipulate (*manipulable materials*).**

### 6.1.1 Key qualities of enrichment materials<sup>6</sup>

Enrichment materials should fulfil the following attributes:

- **SAFE: In all cases enrichment materials must not compromise the health of the animals<sup>7</sup>** (i.e. safe for the pigs).

Listed below are examples of unsafe materials that should not be used:

Risk of injuries:

- synthetic rope swallowed in pieces may cause intestinal obstruction
- metal strips in tyres can cut the mouth when pigs bite into them
- older and drier wood may splinter when bitten into

Risk of biological or chemical contaminations:

- poorly stored straw, untreated peat/mushroom compost can harbour disease-causing agents
- dry sawdust when airborne is dusty and irritating
- dirty enrichment objects can provide a reservoir for disease-causing agents

In addition, enrichment materials should meet one or more of the following qualities:

- **EDIBLE OR FEED-LIKE:** the pig should be able to eat or smell it and/or the material should present an odour and palatable flavour, preferably including some nutritional/digestive benefit.

<sup>5</sup> For the purpose of this guidelines, *enrichment materials* mean materials to enable proper investigation and manipulation activities

<sup>9</sup> Scientific Opinion concerning a multifactorial approach on the use of animal and non-animal-based measures to assess the welfare of pigs. EFSA Journal 2014;12(5):3702, 101 pp. doi:10.2903/j.efsa.2014.3702

<sup>7</sup> Paragraph 4 of Chapter I of Annex I to Directive 2008/120/EC

- **CHEWABLE:** the pig should be able to bite it, e.g. fresh wood or natural rope.
- **INVESTIGABLE:** the pig should be able to root with it, e.g. sawdust or peat.
- **MANIPULABLE:** the pig should be able to change its location, appearance or structure, e.g. mushroom compost.

### 6.1.2 How enrichment materials should be provided<sup>8</sup>

Enrichment materials should be:

- a) **OF SUSTAINABLE INTEREST:** novelty value encourages exploratory behaviour, therefore regularly replace/replenish is required.

There is sustainable interest when pigs regularly explore the materials over time.

There is no sustainable interest in the material provided when pigs start to bite or chew other elements at their disposal like parts of the accommodation (bars, drinkers, etc.) or their faeces.

Depending on the enrichment material, the interest on it may vary. Those which are ignored more quickly are regarded as less enriching for the animals (especially artificial ones e.g. made out of iron or plastic).

It should be favoured frequent provision of small quantities of material instead of large quantities at once. This creates novelty and avoids possible alteration of the materials making them less attractive and possibly unsafe.

- b) **ACCESSIBLE** for oral manipulation to all pigs at all times.

The lower enrichment materials are placed, the better (as long as they are clean) because it facilitates pigs to interact with them.

- c) **SUFFICIENT QUANTITY** for any pig to gain access when they are motivated to do so. Insufficient quantities of good enrichment materials generate competition which leads to aggression.

- d) **CLEAN:** pigs will lose interest in enrichment material that is soiled with faeces. Materials can become heavily soiled when provided at ground level.

### 6.1.3 Types of enrichment materials

A non-exhaustive list of materials possibly used for enrichment is provided in Table 1 of Annex I and can be divided into three categories (optimal, suboptimal and of marginal interest) based on the nature of the material itself and on the way it is presented (as bedding or not).

#### ➤ **OPTIMAL MATERIALS**

Optimal materials can be used alone because they possess all the necessary characteristics to meet pigs' needs.

They include straw, (from cereals and legumes), green fodder (hay, grass, silage, alfalfa, etc.), miscanthus pressed or chopped, root vegetables (e.g. turnips, fodder beet swede) when used as bedding.

<sup>9</sup> Scientific Opinion concerning a multifactorial approach on the use of animal and non-animal-based measures to assess the welfare of pigs. EFSA Journal 2014;12(5):3702, 101 pp. doi:10.2903/j.efsa.2014.3702

➤ **SUBOPTIMAL MATERIALS**

Suboptimal materials can be used as an essential component of the pig's enrichment but should be used in combination with other materials.

They include peanut shells, ground wood, ground maize corn cobs, natural ropes, compressed straw cylinders, pellets, hessian cloth, shredded paper or natural soft rubber.

Suboptimal materials used as bedding usually meet the needs for investigation and manipulation but are not necessarily edible or chewable.

A combination of materials should be used in systems where bedding cannot be provided as a source of enrichment. This means that different forms of stimulation should be offered in a pen i.e. if there is soft wood attached to a chain then consider providing other edible forms of enrichment such as vegetable roots (turnips etc.) or forages in racks etc.

In partially or fully slatted floor materials considered as optimal (when used for bedding) can be supplied through feeders, racks or cylinders. The use of straw or green fodder on slatted floors requires that the material is chopped, even if it is less attractive than long straw. Careful management and adequately sized gaps in the feeders or racks may help prevent too much enrichment material from being pulled out and falling onto the slats.

Some farmers have managed successfully to handle straw in partially slatted systems. Experience from fattening pig farms shows that it is rarely necessary to clean the solid pen area where the straw is placed, as the pigs generally use the slatted area for defecating.

With regard to the practical management of the slurry system, the mechanical scrapers used, the pump and other technical aspects, there is apparently no single solution available. The management and technical aspects of the system should be adapted to the situation on the farm in question.



*Straw in a partially slatted floor*

For piglets, treated peat and soft materials such as sisal rope, hemp rope or burlap sacks function well. They are also attractive for weaners as well as all other categories of pigs but care needs to be taken to arrange them in such a way that the pig cannot tear off large pieces which could fall through the slats and interfere with the slurry removal system.



*Natural rope*

Fresh wood (pieces of trees cut during recent months and not dried), preferably suspended in a horizontal position below snout level, is efficient in sustaining pigs' interest over months. It is suitable for all age groups, but piglets may prefer softer materials. In order to maintain active biting and exploration, pieces of wood should be replaced with fresh ones at regular intervals to ensure a sufficient quantity that is still odorous and fresh.



*Fresh wood*

For farrowing sows there may be difficulties in providing environmental enrichment, but straw can be cut to a length that is compatible with most farrowing systems, and alternatively jute cloths or sacks can be provided. Several materials described in this document are already in use in crates.

➤ **MATERIALS OF MARGINAL INTEREST**

Materials of marginal interest should not be used as essential or single component of pig enrichment materials. They can provide distraction but should not be considered as fulfilling the essential needs of the pigs. Other materials should also be provided.

Materials of marginal interest include objects, such as hard plastic piping or chains.

Some objects should not be used because they can become unsafe for the pigs after a certain period of time such as tyres containing metal strips or pointed plastic objects.



## 6.1.4 How to assess enrichment materials?

In practice, to check whether pigs have access to sufficient enrichment materials, the following steps may be assessed:

**Table 1 – Assessment method for enrichment materials<sup>9</sup>**

1. Observe active pigs for 2 minutes ("adaptation time") standing up in front of the pen				
2. Count the number of pigs which are exploring an enrichment material (A)				
Include if the snout/mouth is manipulating/investigating/chewing optimal or suboptimal materials (straw, hay, wood, sawdust, mushroom, compost, peat, roughage (if not part of ration) OR in contact with other material of marginal interest (hanging object or ball)				
3. Count the number of pigs which are interacting with other pigs and pen fittings (B)				
Include if snout/mouth is in contact with any part of another pig, with muck or the floor, fixtures or fittings of the pen. Empty chewing, tongue rolling etc. is included here (pay attention at feeders or drinkers to distinguish between manipulation of fittings and eating/drinking).				
4. Score the pigs' access to enrichment materials:				
$\text{Number of pigs doing (A)} / \text{Number of pigs doing (A) + (B)} = Z$				
$Z \times 100 = X \text{ (result in \%)}$				
5. Compare the X result with the table below:				
MAXIMAL EXPLORATORY BEHAVIOUR	INTERMEDIATE EXPLORATORY BEHAVIOUR			MINIMAL EXPLORATORY BEHAVIOUR
100- 86.4 %	86.3-68.9%	68.8-44.5%	44.4-18.1%	18.0-0.0%
<b>If under this assessment pigs are scored as exhibiting "minimal exploratory behaviour" consider making appropriate management changes in the farm by introducing enough optimal or suboptimal materials.</b>				

Additionally, the welfare indicators as described in Table I of Annex II should be checked in order to ensure that pigs benefit from proper enrichment materials.

## 7. OTHER MANAGEMENT MEASURES<sup>10</sup>

**The provision of adequate enrichment material is an essential starting point but there are other factors involved** in preventing tail-biting<sup>11</sup>.

<sup>9</sup> Adapted from the Coordinated European Animal Welfare Network (EUWelNet)

<sup>10</sup> Scientific Opinion of the Panel on Animal Health and Welfare on a request from Commission on the risks associated with tail-biting in pigs and possible means to reduce the need for tail-docking considering the different housing and husbandry systems. The EFSA Journal (2007) 611, 1-13

<sup>11</sup> The measures described below in this section are without prejudice to the legal requirements arising, inter alia, from the provisions of Directive 2008/120/EC.

### **6.2.1 Thermal comfort and air quality**

The risks associated with thermal comfort and air quality include extremes of temperature and draughts (high airspeed), which affect the pig's ability to control its body temperature.

Heat stress is a major factor for discomfort in pigs. They try to rid themselves of excess heat through lying on cool surfaces and/or additional drinking. For these reasons, it is important to maintain an indoor climate as close to the pig's optimum temperature as possible and equally draughts should be avoided. This may require different strategies not only dependant on the season and the natural conditions in the country but also on the housing system.

Poor air quality (low ventilation), with high levels of dust and harmful gases resulting from inadequate ventilation is another risk factor. Increased levels of ammonia and dust for example result in respiratory problems. Care should thus be taken to maintain the level of these gases within the comfort zone for pigs.

### **6.2.2 Health status**

Being in the same group as pigs with a retarded growth rate, a general poor herd health status and/or the presence of clinical disease have all been characterized as a hazard.

Preventive measures would include setting up a general herd health plan together with a veterinarian. The herd health plan, including appropriate vaccination programme, would allow improving and maintaining good herd health.

### **6.2.3 Competition**

This covers all aspects which may lead to competition e.g. high stocking density, inadequate numbers of feeders or drinkers compared to the number of individuals in the group, delays in the delivery of feed and mixing of animals (excluding weaning time). Competition for resources, social instability and high stocking densities may all be identified by unrest in the group, including increased levels of aggression and skin lesions.

All animals should have access to both feeders and drinkers to avoid competition over these resources. It should also be checked that these systems are working and that the animals actually have access to water. It is likewise necessary to plan well the distribution of pigs within the farm to minimise the need for mixing.

### **6.2.4 Diet**

The feed related factors which have been widely implicated in the occurrence of tail-biting are nutritional deficiencies, in particular deficiencies in sodium, total protein or specific amino-acids such as tryptophan.

It is thus important to ensure the correct balance of nutrients in the diet containing adequate levels of salt and essential amino-acids.

An abrupt change of feed composition especially to a lower nutrient density, may also lead to tail-biting and should therefore be avoided.

## 8. WHEN CAN TAIL DOCKING BE CARRIED OUT?

**Routine tail-docking is not permitted**<sup>12</sup>. Tail-docking may only be carried out if there is evidence of previous lesions (tail/ears/teats...) and **only after** all known risk factors mentioned below (see point 6) have been addressed.

When an outbreak of tail-biting occurs, all known risk factors should be considered, recorded and suitable management changes should be made in those areas identified as being at risk.

## 9. WHAT TO DO IF AN OUTBREAK OF TAIL-BITING STARTS?

The presence of animals biting other pen mates or being bitten by others needs an immediate response. Tail-bitten or tail-biting pigs should be isolated while injured animals should be treated appropriately<sup>13</sup>. This should be done promptly once evidence of tail-biting is discovered.

Increased tail lesions and restlessness of pigs as well as lowered tail posture are good indicators of the initial stages of an outbreak of tail-biting.

Based on regular monitoring of the husbandry conditions, the initial management changes should be evaluated. If those are not successful in reducing tail-biting, then a reassessment of the measures introduced should be made to identify areas where further suitable changes need to be made.

This process should continue until tail-biting behaviour stops. When tail-biting has stopped, then some batches (1-2 litters) of undocked tails should be trialled – with a view to stopping the docking of tails.

## 10. HOW TO ASSESS MANAGEMENT MEASURES TO MINIMISE TAIL-BITING<sup>14</sup>?

To assess whether the measures put in place to minimise or stop the occurrence of tail-biting are appropriate, the indicators described in Table II of Annex II may be used. The case should then be looked into and corrective action taken if appropriate.

However, the **single most important animal-based welfare indicator for weaned, growing and finishing pigs is an intact curly tail.**

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<sup>12</sup> Paragraphs 8 of Chapter I of Annex I to Council Directive 2008/120/EC of 18 December 2008 laying down minimum standards for the protection of pigs (OJ L 47, 18.2.2009, p. 5).

<sup>13</sup> Paragraph 3 of section D of Chapter II of Annex I to Council Directive 2008/120/EC

<sup>14</sup> Scientific Opinion concerning a multifactorial approach on the use of animal and non-animal-based measures to assess the welfare of pigs. EFSA Journal 2014;12(5):3702, 101 pp. doi:10.2903/j.efsa.2014.3702

## ANNEX I – TYPES OF ENRICHMENT MATERIAL

Possible enrichment materials<sup>15</sup> used for pigs and their interest as enrichment material can be summarised in the following table:

**Table 1 – Enrichment materials**

Materials	Provided as	Level of interest as enrichment materials	May be complemented by...
Straw, hay, silage, miscanthus, root vegetables	Bedding	Optimal	<b>Can be used alone</b>
Soil	Bedding	Suboptimal	Edible and chewable materials
Wood shaving	Bedding	Suboptimal	Edible and manipulable materials
Sawdust	Bedding	Suboptimal	Edible, chewable materials
Mushroom compost, peat	Bedding	Suboptimal	Edible materials
Sand and stones	Bedding	Suboptimal	Edible and chewable materials
Shredded paper	Partial bedding	Suboptimal	Edible materials
Pellet dispenser	Dispenser	Suboptimal	Depending on the amount of pellets provided
Straw, hay or silage	Rack feed or in dispenser	Suboptimal	Investigable and manipulable materials
Soft, untreated wood, cardboard, natural rope, hessian sack	Object	Suboptimal	Edible and investigable materials
Compressed straw in cylinder	Object	Suboptimal	Investigable and manipulable materials
Sawdust briquette (suspended or fixed)	Object	Suboptimal	Edible, investigable and manipulable materials
Chain, rubber, soft plastic pipes, hard plastic, hard wood, ball, salt lick	Object	Marginal	<b>Should be completed by optimal or suboptimal materials</b>

<sup>15</sup> This list is not exhaustive and the materials are not ranked. Other materials may be used provided they meet legal requirements.

## ANNEX II – ANIMAL WELFARE INDICATORS

**Table 1- Welfare indicators of enrichment materials**

Non-animal based indicators	Animal based indicators
<ul style="list-style-type: none"> <li>➤ <b>Sustain interest:</b> is the material sufficiently frequently renewed?</li> <li>➤ <b>Access:</b> is the material easily accessible to the pigs?</li> <li>➤ <b>Sufficient quantity:</b> Are all pigs able to have enough materials to use at the same time?</li> <li>➤ <b>Clean:</b> is the material soiled with excreta?</li> </ul>	<ul style="list-style-type: none"> <li>➤ Abnormal behaviours such as:               <ul style="list-style-type: none"> <li>! Pigs do not often use the materials provided over time</li> <li>! Pigs bite other elements than the materials provided (bars, tails/ears of other pigs, etc.)</li> <li>! Pigs root and manipulate their dung</li> <li>! Pigs compete or fight for the use of materials</li> <li>! Sows perform increased false nest building behaviour</li> </ul> </li> <li>➤ Presence of bitten tails<sup>16</sup></li> <li>➤ Presence of severe skin lesions<sup>17</sup></li> </ul>

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<sup>16</sup> See point 3

<sup>17</sup> See point 3

**Table 2- Animal welfare indicators to assess risks of tail-biting**

Criteria	Non-animal based indicators	Animal based indicators
Presence of biting		<ul style="list-style-type: none"> <li>➤ Increased occurrence of tail lesions and tail-biting behaviour</li> <li>➤ Lowered tail posture</li> <li>➤ Increased restlessness</li> </ul>
Enrichment material	<p>Qualities of the material:</p> <ul style="list-style-type: none"> <li>➤ safe</li> <li>➤ edible</li> <li>➤ chewable</li> <li>➤ investigable</li> <li>➤ manipulable</li> </ul> <p>Management should ensure:</p> <ul style="list-style-type: none"> <li>➤ sustainable interest</li> <li>➤ accessible</li> <li>➤ in sufficient quantity</li> <li>➤ clean</li> </ul>	<ul style="list-style-type: none"> <li>➤ Inappropriate exploratory behaviour (i.e. a low ratio of exploration directed to the enrichment material in comparison to that directed at pen fittings and/or other pigs)</li> </ul> <p>Indicators showing inappropriate provision of enrichment material:</p> <ul style="list-style-type: none"> <li>➤ Presence of bitten tails<sup>18</sup></li> <li>➤ Presence of severe skin lesions<sup>19</sup></li> </ul>
Cleanliness	<ul style="list-style-type: none"> <li>➤ Material soiled with excreta</li> <li>➤ Soiling of pen</li> </ul>	<ul style="list-style-type: none"> <li>➤ Increased false nest building in sows</li> <li>➤ Increased disease</li> <li>➤ Increased dirtiness of animals</li> </ul>
Thermal comfort and air quality	<ul style="list-style-type: none"> <li>➤ Occurrence of: <ul style="list-style-type: none"> <li>➤ extreme or variable air temperature<sup>20</sup></li> <li>➤ high airspeed (draughts)</li> <li>➤ intense light level</li> <li>➤ high level of harmful gases, e.g. carbon dioxide, ammonia</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Increased: <ul style="list-style-type: none"> <li>➤ Panting, shivering</li> <li>➤ Poor body condition, poor coat condition</li> <li>➤ Restlessness</li> <li>➤ Red eyes</li> <li>➤ Modified lying behaviour showing thermal discomfort</li> </ul> </li> </ul>
Health status	<ul style="list-style-type: none"> <li>➤ Poor biosecurity programme</li> <li>➤ Inadequate vaccination programme</li> </ul>	<p>Increased:</p> <ul style="list-style-type: none"> <li>➤ Panting, shivering</li> <li>➤ Lying behaviour (i.e. resting periods)</li> <li>➤ Coughing, sneezing, red eyes</li> <li>➤ Diarrhea</li> <li>➤ Variation in growth within the group</li> </ul>
Competition	<ul style="list-style-type: none"> <li>➤ High number of animals per square meter of floor surface</li> <li>➤ High number of animals per feeder<sup>21</sup></li> <li>➤ Poor mixing management</li> </ul>	<ul style="list-style-type: none"> <li>➤ Increased : <ul style="list-style-type: none"> <li>▪ Skin lesions</li> <li>▪ Aggression</li> <li>▪ Restlessness</li> </ul> </li> <li>➤ Poor body condition</li> </ul>
Diet	<ul style="list-style-type: none"> <li>➤ Changes in diet composition</li> <li>➤ Lack of sodium (salt) in the diet</li> <li>➤ Lack of amino-acids in the diet</li> <li>➤ Lack of energy in the diet</li> </ul>	<p>Increased:</p> <ul style="list-style-type: none"> <li>➤ Poor body condition, diarrhoea</li> <li>➤ Poor coat condition</li> <li>➤ Restlessness</li> <li>➤ Foraging behaviour</li> <li>➤ Gastric ulcers</li> <li>➤ Variation in growth within the group</li> </ul>

<sup>18</sup> See point 3

<sup>19</sup> See point 3

<sup>20</sup> Results suggest tail-biting is more frequent in warmer climates higher than 20°C.

<sup>21</sup> Consideration should also be given to having an appropriate number of drinkers so that all pigs have access to water

**ANNEX III – LIST OF MEETINGS WITH MEMBER STATES AND  
STAKEHOLDERS**

DATE	MEETINGS
8 March 2013	First extended working group meeting on the development of guidelines concerning directive 2008/120/EC
28 June 2013	First drafting group on the development of guidelines on the protection of pigs
9 September 2013	Second extended working group meeting on the development of guidelines concerning directive 2008/120/EC
5 March 2014	Second drafting group on the development of guidelines on the protection of pigs
11 March 2014	First stakeholder meeting on the development of guidelines concerning Directive 2008/120/EC on the protection of pigs
1 July 2014	Second stakeholder meeting on the development of guidelines concerning Directive 2008/120/EC on the protection of pigs

Stakeholders consulted:

General Confederation of Agricultural Cooperatives in the European Union (COPA COGECA)  
Meat Processing Industry in the European Union (CLITRAVI)  
European Livestock and Meat Trades Union (UECBV)  
EuroCommerce  
Federation of Veterinarians of Europe (FVE)  
Eurogroup for Animals  
Compassion in World Farming (CIWF)  
PROVIEH  
World Animal Protection  
Animals' Angels  
Bristol University  
Agri-Food and Biosciences Institute  
Queen's University Belfast  
Centro Ricerche Produzioni Animali