



WRO

WORLD RENDERERS ORGANIZATION

GUIDELINES FOR HYGIENIC RENDERING

WRO SCIENTIFIC ADVISORY PANEL
VERSION 1 - OCTOBER 2013

Preface

Guidelines for Hygienic Rendering

In 2010, a “road map” for World Renderers Organization (WRO) members was adopted by the membership. One of the recommendations was to produce best-practice guidelines. Best-practice guidelines could signal that the WRO can provide useful advice and uniform approaches to rendering on a global scale.

In principle it is expected that such guidelines could be useful to both renderers and agencies with a global perspective such as WHO, FAO, Codex Alimentarius and OIE.

Rendering around the world is carried out with different equipment, different mixes of raw material and different regulatory environments. For these reasons, best practice is not necessarily applicable on a universal basis.

Therefore as a starting point, the WRO has prepared guidelines, rather than best-practices, which may not be applicable, or even legal, in some countries.

Terms of references for WRO guidelines were prepared and a range of topics that could be suitable subjects for guidelines were listed. It was proposed that the first guidelines should be about hygiene and product safety. It was recognised that some countries have well-established legislation or codes of practice relating to the safety of rendered products. The WRO guidelines are not intended to be used instead of existing legislation or codes of practice but extracts from existing codes and legislation have been incorporated into the guidelines. The guidelines have been developed as minimum requirements which can be augmented in different countries depending on circumstances. While countries may have codes and legislation that differ from the WRO guidelines, the guidelines should demonstrate that renderers who face common issues around the world can apply universal principles to address these issues.

The guidelines were drafted by Bill Spooncer and were further developed by David Meeker and Martin Alm. Stephen Woodgate completed the final editing. The guidelines have been approved by the membership of the WRO.

October 2013

World Renderers Organization

Guidelines for Hygienic Rendering

1.1 Preface

The World Renderers Organization (WRO) was established in 1999. The purpose of the WRO is to share information between renderers around the world and to represent renderers at international forums. The WRO has represented the world rendering community at Codex Alimentarius meetings, has successfully presented renderers' points of view to the OIE and FAO and has sponsored speakers and events at international animal feeds conferences.

An initiative of the WRO is to develop industry best practices. The WRO recognizes that rendering around the world is carried out with different equipment, different mixes of raw material and different regulatory environments. For this reason, best practice is not necessarily applicable on a universal basis. However, renderers face some common issues which can be addressed by applying universal principles. The principles are presented as WRO guidelines.

Renderers around the world operate according to varying degrees of regulation or codes of practice. Regulation and codes of practice are generally designed to address country specific issues. The WRO's guidelines are not intended to replace or even augment country specific regulations or codes of practice unless appropriate. The guidelines are intended to be used by renderers who do not operate in regulatory or industry frameworks that provide for production of safe products in an energy efficient manner and with minimum impact on neighbours and the environment in general.

1.2 Scope

The scope of this guideline applies to the management, construction and operation of rendering plants. The guidelines provide recommended and best-practice principles which will facilitate control over hygienic production of animal protein meals and animal fats and oils intended for use as animal feeds. The guidelines have the following components:

- recommendations for a documented quality management system;
- recommendations for the hygienic construction of premises;
- recommendations for the hygienic operation of rendering plants;
- validation and verification of effective heat treatments;
- microbiological sampling and testing to verify the effective implementation of the quality management system;
- recommendations for product traceability, prevention of feeding ruminant proteins to ruminants and training.

1.3 Objectives

The objectives of the guidelines are:

- to provide guidance to management about production of rendered products that are safe to use as animal feeds and comply with customer requirements for hygienic production;
- to provide guidance about setting and maintaining heat treatments that ensure that relevant biological hazards that may be associated with raw material are eliminated;
- to provide guidance about microbiological testing of finished product as a means of verifying that hygienic rendering practice are effective and to alert management to take corrective action.

1.4 Definitions

BSE-risk material	Materials that are recognized as being associated with the risk of carrying the BSE infective agent. Specific definitions vary between regions and regional BSE-risk status.
Cooker	A vessel for dry rendering in which material is heated, fat is liquefied and water is evaporated by boiling and deep-frying in fat.
Contamination	The presence of physical, chemical or biological material that makes rendered products unsafe for use as animal feed.
Dry clean	Cleaning methods such as sweeping, vacuuming, scraping and blowing which are applied in the dry or finished product areas of the rendering plant.
Dry rendering	The process of separating fat from dried solids. Usually comprises heating raw material to melt fat, coagulate protein and evaporate water by boiling and deep-frying in fat. The fat is separated by draining and pressing the dried solids.
HACCP (hazard analysis critical control point)	Systematic method of identifying and assessing hazards and identifying methods to control hazards.
Hazard	A biological, chemical or physical agent in, or condition of, feed or food with the potential to cause an adverse health effect.
Heat Treatment	The process of heating material in a rendering or drying process at temperatures and for times which in combination

	are sufficient to destroy harmful micro-organisms.
Meal	Defatted and dried solid product of rendering after milling.
Quality management system	Documented and implemented policies and procedures intended to define the production of rendered products that are safe and fit for purpose.
Raw material	Materials derived from animals and intended to be rendered to produce fats, oils, protein meals and fertilizer. NB: May include used cooking oils (UCO) in some countries or regions but would only apply for UCO that is processed by rendering
Render vessel	Heated tank or continuous-flow container used in the wet-rendering process to heat raw material in preparation to fat extraction and dewatering of solids.
Rendering	The process of heat treating raw material to liberate and extract fat and dry defatted material. May also apply to drying of animal protein material that does not require preliminary fat extraction.
Size reduction	Cutting raw material into uniform sized particles using equipment such as pre-breaker hogger, pre-hog, mincer or grinder.
Safe	Will not cause infection or intoxication when properly handled and prepared for its intended use; Does not contain chemical residues in excess of established limits. Free from uncontrolled levels of foreign material.
Validate	Obtain evidence to demonstrate that a control measure achieves the intended level of control.
Verify	Use of methods, procedures tests and other evaluations intended to demonstrate consistent and effective implementation of the quality management system.
Wet clean	Cleaning methods that use water and chemical cleaning agents and are applied in the wet areas of the plant including raw material handling areas and processing areas.
Wet rendering	The process of extraction or separation of liquid fat from wet solids. Usually comprises heating of cut raw-material

	to melt fat and coagulate protein followed by pressing or centrifugation to separate fat and free water from solids and further centrifugation to separate fat from the water phase.
--	--

1.5 Management plan

Outcome: Management of rendering establishments should plan to produce rendered products that are safe for use as animal feeds and which comply with customer requirements.

1.5.1 Rendering establishment should develop a documented quality management system for the production of rendered products.

1.5.2 Best practice is to document a quality management system that complies with either of the international standards:

- **ISO 9001:2008 “Quality management systems – Requirements.” or,**
- **ISO 22000-2005 “Food safety management systems – Requirements for any organization in the food chain.”**

1.5.3 At the minimum, rendering establishments should document a quality management system that includes the following elements:

- a quality policy that states the management’s commitment to produce rendered products that are safe for use as animal feeds and which comply with customer requirements;
- responsibilities of people who manage product quality;
- management review;
- internal audits;
- product recall plans;
- procedures for collection of raw material that explain:
 - precautions taken to minimize contamination of raw material by foreign objects such as plastic and metal (these precautions can include inspection of raw material and use of metal detectors);
 - how raw material intake is recorded such that all raw material can be traced back to suppliers according to quantity and day of supply;
- procedures for the hygienic production of rendered products. These procedures are pre-requisite to developing a HACCP and should be designed to control hazards to food and feed safety. They should include at least:
 - design of the rendering plant to avoid cross-contamination of heat treated material by raw material, i.e. maintain the integrity of clean and unclean areas;

- cleaning procedures for the wet and dry processing areas of the rendering plant and including inspection of cleanliness;
 - procedures of control of pests including bird vermin and insects;
 - personnel hygiene including movement of personnel between raw material and cooked product areas;
 - packaging, storage and labeling of products,
 - calibration of measuring equipment;
 - maintenance procedures;
 - traceability of raw material and finished product.
- work instructions for specific production procedures including:
 - operation of the heat treatment including size reduction equipment and render vessel/cooker and drier;
 - operation of tallow/liquid phase and solids separation equipment such as press and/or decanter;
 - operation of mill and milled meal screen;
 - bagging or bulk load-out of meals;
 - other operations as appropriate such as feather hydrolysing and blood coagulating.

1.5.4 The quality management system should include a HACCP plan. The HACCP plan should be prepared according to the guidelines for application of HACCP contained in the Codex Alimentarius code of practice: “Recommended International Code of Practice General Principles of Food Hygiene”.

1.6 Construction of premises and equipment

Outcome: Premises and equipment do not introduce risks of contamination of rendered product via pests, leakage, and unhygienic conditions.

1.6.1 The buildings in which rendering operation take place and in which rendered products are handled and stored should be fully roofed. The roof should be in good repair and weather proof. Rendered products may be stored outside the building in enclosed bins, silos containers or tanks provided that the storage vessels are weather and water proof.

1.6.2 Raw material reception areas may be outside the building. If outside, raw material the storage bins should be covered.

1.6.3 Load-out areas should be under cover to protect load out equipment from rain, insects, birds, vermin and rodents

1.6.4 Best practice is for all rendering buildings, raw material receival areas and product storage areas to be in enclosed building which effectively restrict

- access for insects, birds, vermin and rodents. For example, doors should be close fitting and kept closed.**
- 1.6.5 If there is outside reception of raw material and product storage, pest control procedures should be sufficient to control pests in these areas.
- 1.6.6 Rendering premises should be situated away from livestock housing or yards and should be protected from dust, spray, aerosols and liquid that might emanate from livestock handling.
- 1.6.7 All buildings should be soundly constructed of durable materials.
- 1.6.8 Best practice is for floors and walls to be constructed from smooth and impervious material and surface should be maintained in this state for ease of cleaning.**
- 1.6.9 Floors should smooth and impervious and not allow pooling of water.
- 1.6.10 Drainage through all areas should be contained in drains and not lie on floors.
- 1.6.11 There should be sufficient separation between raw material reception and handling and cooked product handling to prevent any risk of contamination of cooked product by splashes, aerosols or dust from the raw material area.
- 1.6.12 Best practice is to have floor to ceiling walls that enclose raw material handling, rendering processes, milling and meal storage in separate areas.**
- 1.6.13 Equipment, floors, walls, including cable trays should be constructed so that they can be effectively cleaned.
- 1.6.14 Hand wash facilities supplied with warm water, soap and paper towels and connected to a drain should be provided at convenient locations.
- 1.6.15 Exposed glass should be not permitted in the rendering premises. Glass light fittings and any other glass must be enclosed to protect against impact and to contain broken glass.

1.7 Operational requirements

Outcome: All activities in rendering plants are carried out by methods that eliminate and prevent contamination of product by biological, chemical and physical hazards

- 1.7.1 Raw material should be inspected for foreign material such as plastic and metal and if possible contaminants should be removed.
- 1.7.2 The condition of raw material including assessment of foreign material and unusual odours should be recorded.
- 1.7.3 Raw material that is suspected of being contaminated with chemical hazardous substances such as used-mineral oils and other potential sources of high levels of PCB or dioxin must not be used to make rendered products that may be used as animal-feed ingredients.

- 1.7.4 In countries where there are prohibitions on rendering BSE-risk materials, dead stock, or other specified biological materials, raw material contaminated with these contaminants must not be used to make rendered products that may be used as animal-feed ingredients.
- 1.7.5 Unacceptable amounts of foreign material in raw materials should be reported to the supplier so that corrective action can be taken.
- 1.7.6 The rendering plant should be divided into identifiable areas where wet cleaning and dry cleaning are applied.
- 1.7.7 There should be separate equipment to clean the rendering plant in the wet clean and dry clean areas.
- 1.7.8 Spillages should be cleaned up without delay. Any spillages of cooked material should be considered to be contaminated and be reprocessed through the heat treatment or be disposed of safely. Spillages of raw material and cooked material should not be rendered if there is a risk that they could be contaminated by chemicals.
- 1.7.9 Floor sweepings or material dislodged from equipments during cleaning should be collected and reprocessed through the heat treatment or be disposed of.
- 1.7.10 Cleaning equipment and other moveable equipment such as shovels, barrows and squeegees used in raw material areas should be clearly identified e.g. by colour coding or labeling.
- 1.7.11 Pest control and cleaning chemicals should be approved if official approvals are available, or should be assessed by management to determine if they are appropriate for use.
- 1.7.12 Pest control and cleaning chemical should be stored securely to prevent any risk of contamination of rendered products.
- 1.7.13 Personnel who work in raw material areas must not enter cooked-product areas unless they ensure that their hands, boots and clothes are cleaned.
- 1.7.14 Best practice is to employ separate staff in raw material and cooked products areas.**
- 1.7.15 Truck bodies, tankers and shipping containers should be inspected and found to be clean, or cleaned before they are loaded.
- 1.7.16 Evidence should be sought that trucks, tankers or containers have not carried prohibited prior cargoes.

1.8 Heat treatments

Outcome: Heat treatments used in rendering and drying operations are defined, validated as capable of eliminating identified hazards and are applied consistently.

- 1.8.1 Heat treatments should be specified in terms of:

- minimum end point temperature achieved;
 - minimum pressure and duration of the application of pressure, if applicable;
 - total time in the heat treatment or feed rate to continuous systems;
 - particle size of raw material.
- 1.8.2 These heat treatments parameters should be specified as critical limits in the HACCP plan.
- 1.8.3 The heat treatments must be adequate to eliminate significant potential microbial hazards identified in the HACCP plan.
- 1.8.4 The heat treatments can be validated as adequate by:
- reference to scientific literature;
 - reference to regulations that apply in various countries;
 - reference to international standards such as the OIE Terrestrial Animal Code or Codex Alimentarius Commission Codes or Standards;
 - compliance with a suitable microbiological performance standard.
- 1.8.5 Where the identified potential biological hazards are microbiological organisms including spore-forming organisms such as *Bacillus anthracis*, a suitable performance standard is elimination of *Clostridium perfringens*.
- 1.8.6 *Clostridium perfringens* is found in the intestines of all animal and is likely to be part of the microbial flora of raw material that contains intestinal material. An example of an annual validation process is:
- collect samples of material discharged from the heat treatments and drained of fat on ten consecutive days of operation while the heat treatment is operating at or close to the defined parameters (critical limits);
 - test each day's sample for *Clostridium perfringens*;
 - the parameters of the heat treatment that apply at the time the samples were taken are validated if the results of *Clostridium perfringens* testing are reported as <10 per gram in each of the 10 samples;
 - this method of validation is not appropriate if raw materials are not likely to include *Clostridium perfringens* in the microbial flora e.g. blood and materials that are predominately fat and bone.
- 1.8.7 The parameters of the validated heat treatments must be monitored during production to verify that the minimum validated heat treatment is applied consistently.
- 1.8.8 Any product that is not processed according to the minimum validated heat treatment must be intercepted and reprocessed or disposed in a manner in which it is not used as animal feed.

- 1.8.9 Instruments used to measure and/or record heat treatment parameters must be calibrated regularly (for example every six months).
- 1.8.10 Any measuring device/instrument that is broken, does not agree with other equipment measuring the equivalent parameters or is otherwise suspected of being out of calibration should be replaced or repaired and re-calibrated without delay.

1.9 Microbial testing

Outcome: Microbiological testing programs should verify that hygienic practices are applied consistently and effectively.

- 1.9.1 Procedures to reduce the risk of post-processing contamination of cooked product, for example by *Salmonellae* (and/or surrogates such as other pathogens or indicator organisms e.g. *Enterobacteriaceae*) should be verified by microbiological testing.
- 1.9.2 Sampling plans for microbiological testing should take account of legislation, customer requirements, recognized good practice and the expected risk of contamination.
- 1.9.3 At the minimum a sample should be tested weekly for *Salmonellae* in 25 grams or for an alternative surrogate. The weekly sample should be a composite of samples collected from load-outs on a daily basis.
- 1.9.4 On days where there is no load out, the samples should be taken from storage.
- 1.9.5 If *Salmonellae* is detected in any sample, or if a surrogate is present in excess of an acceptable limit :
- conduct an immediate review of hygiene procedures; and
 - implement and record corrective action.
- 1.9.6 If corrective action is not effective e.g. if *Salmonellae* are detected in any of the 5 subsequent weekly samples, the frequency of testing should be increased to one sample per day until corrective action is shown to be effective by the absence of *Salmonella* in 10 consecutive daily samples.
- 1.9.7 All microbiological testing should be carried out by an approved or suitable accredited laboratory.

1.10 Ruminant feeding

Outcome: Users of rendered products are aware that ruminant protein material must not be feed to ruminants.

- 1.10.1 According to a World Health Organization Recommendation of 1999, ruminant protein i.e. ruminant meat and bone meal must not be fed to ruminants. This recommendation is intended to reduce the risk of the spread of BSE.

1.10.2 Various countries have introduced other precautions to reduce the risk of the spread of BSE ranging from bans on feeding an extended range of animal material to ruminants and removal of BSE-risk materials from raw material for rendering.

1.10.3 Renderers must comply with any legislation that applies but at the minimum:

- Renderers should inform customers by labelling product, or by providing other documentation, advising that animal protein meal derived from ruminants must not be feed to ruminants. Ruminant blood protein meal may be excluded from this guideline unless legislation is in place that restricts feeding ruminant blood to ruminants. Other ruminant proteins that are not generally products of rendering e.g., milk, eggs and in some circumstances gelatin are excluded from the ban on feeding ruminant material to ruminants.
- If tallow contains residues of ruminant protein i.e. the insoluble impurities of tallow derived from ruminant material are greater than 0.15%, the tallow is not eligible for feeding to ruminants and customers should be advised accordingly.

1.11 Traceability

Outcome: Raw material and products are identified and related. Products can be traced to customers and recalled if necessary.

1.11.1 Records of receipt of raw material must be maintained. The records should include:

- date of receipt;
- type of material;
- source of material (supplier);
- quantity of material.

1.11.2 Records of the dispatch of all finished products must be maintained. These records should include:

- date of dispatch;
- description of product;
- destination or customer including address;
- quantity of product;
- details of the carrier.

1.11.3 Renderers should obtain and retain contact details of all customers and should not sell or supply any products without customer contact details.

1.11.4 Packaged products including product in bulks bags should be labelled with:

- date of production or batch number;

- name of the manufacturer.

1.12 Training

Outcome: Staff understands hygienic rendering practices.

- 1.12.1 Management should implement a documented training program to ensure that staff are trained in hygienic practices and identification of risks to product safety.
- 1.12.2 Training programs should identify methods of training or training suppliers.
- 1.12.3 Training programs should include assessments to ensure that trained personnel are competent to perform.
- 1.12.4 Industry managed training programs should be used if available.

WORLD RENDERERS ORGANIZATION

The WRO is the organization that represents the rendering industry worldwide, serving as an exchange platform for education and information amongst its members and with like-minded associations around the world. WRO represents its members in international government and world organization forums debating topics such as food production, animal and human health, and the environment.

WRO HEAD OFFICE, 500 MONTGOMERY STREET,
SUITE 310, ALEXANDRIA, VA 22314

WWW.WORLDRENDERERS.ORG