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REPORT OF THE ELECTRONIC WORKING GROUP ON THE DRAFT GUIDELINES FOR STANDARDIZATION OF THE REPRESENTATION OF SANITARY ATTESTATIONS IN OFFICIAL CERTIFICATES

*(Prepared by the Electronic Working Group chaired by Brazil and co-chaired by Australia, India, Kenya,
Spain and Uganda¹)*

(At Step 3/4)

Codex Members and Observers wishing to submit comments, at Step 3/4, on this draft (Appendix I) should do so as instructed in CL 2026/75-FICS available on the Codex webpage/Circular Letters 2026: <https://www.fao.org/fao-who-codexalimentarius/resources/circular-letters/en/>

BACKGROUND

1. The standardization of the representation of sanitary attestations in official certificates was identified as a relevant area of work given that current drafting practices for the attestations included in official certificates sometimes lead to ambiguity, duplication, or inconsistent interpretation. Such challenges can affect the negotiation of new certificates, the revision of existing ones, and the efficient implementation of certification systems, both for paper-based and electronic certification.
2. The 27th Session of the Codex Committee on Food Import and Export Inspection and Certification Systems (CCFICS27) considered a discussion paper, presented by Brazil, proposing the development of guideline on how countries could simplify and standardize the representation of sanitary requirements in attestations or statements included in official certificates. The Committee recognized the potential benefits of consistent representation across certificates and contexts — including reuse of attestation language, reduction of duplication, and improved mutual understanding between competent authorities.
3. It was agreed to forward the new work proposal to the Codex Alimentarius Commission at its 47th Session (CAC47), and to establish an electronic working group (EWG), if approval was given by CAC, to advance this work. The new work was approved by CAC, the EWG chaired by Brazil and co-chaired by Australia, India, Kenya, Spain and Uganda, working in English.
4. Throughout the EWG's work, the focus of the guideline was initially framed around the representation of “sanitary requirements”, the work has focused specifically on “sanitary attestations” — that is, the statements contained in official certificates confirming that food safety requirements have been met for the consignment covered by the certificate. The title has been updated to reflect the focus on the EWG.

PARTICIPATION AND METHODOLOGY

5. The EWG was chaired by Brazil and co-chaired by Australia, India, Kenya, Spain and Uganda. It was managed through the Codex Online Forum, complemented by virtual meetings held over a period of approximately 15 months. The EWG benefited from active participation by the following Members and Observers (in addition to the Chair and Co-Chairs): Canada, Japan, Mexico, Netherlands (Kingdom of the), Switzerland, Thailand, United Kingdom, and United States of America. The EWG operated in an open and inclusive manner, with all participants invited to share contributions, raise concerns, and submit proposals.

¹ EWG members: Australia, Brazil, Canada, India, Japan, Kenya, Mexico, Netherlands (Kingdom of the), Spain, Switzerland, Thailand, Uganda, United Kingdom, United States of America

6. The work was structured in incremental phases, with virtual meetings and written contributions through the Codex Online Forum. A total of 13 virtual meetings were held between December 2024 and April 2026. The principal milestones of the work were as follows:
 - **1st meeting (12 December 2024):** Kick-off meeting; review of project objectives and definition of the first set of activities (Sprint).
 - **2nd meeting (16 January 2025):** Presentation of the technical results of the pilot submitted to CCFICS27, introducing the ontology technique applied to the representation of sanitary attestations and gathering feedback from country specialists.
 - **3rd meeting (20 February 2025):** Feedback session on the pilot results, in which the fundamental conceptual elements of the future guideline began to take shape.
 - **4th meeting (27 March 2025):** Identification of existing Codex publications relevant to the representation of sanitary attestations. An AI-assisted analysis of 388 Codex documents was conducted to determine whether any of them already provided meta-level guideline on how attestations should be written. The analysis concluded that no existing Codex publication explicitly addresses this question.
 - **5th meeting (29 April 2025):** Presentation of the Codex Style for writing attestations — a set of language structures extracted through analysis of existing Codex texts — proposed as the backbone for the first part of the guideline. Other EWG members conducted parallel observations of Codex texts where they found the same fundamental points.
 - **6th meeting (28 May 2025): Validation of the proposed Modality → Communicative Function → Template structure, with substantive input from EWG members.**
 - Modality refers to the intent of an attestation.
 - Communicative Function is the purpose or reason why someone says or writes something.
 - Template structure is a pre-planned format or outline that helps you organize your writing in a clear and logical way.
 - **7th meeting (11 July 2025):** Clarification of the relationship between this initiative and the work conducted by the World Organisation for Animal Health (WOAH) on certificate standardization; presentation of the alignment between the planned supporting toolkit and the initial draft guideline; and circulation of an initial draft of the toolkit for review and feedback.
 - **8th meeting (10 September 2025):** Presentation of the supporting toolkit developed to assist countries during practical validation of the guideline concepts, including discussion of the reflections submitted by some EWG members on the scope of the work, and ensure we focus on the outcomes agreed at CCFICS27.
 - **9th meeting (10 October 2025):** Presentation of the first complete draft of the guideline, made available for collaborative comment.
 - **10th meeting (7 November 2025):** Presentation of the updated version of the toolkit incorporating Member feedback.
 - **11th meeting (12 December 2025):** Consolidation of the first round of contributions to the guideline document and circulation of the consolidated draft for a second round of comments (Round 1).
 - **12th meeting (4 February 2026):** Consolidation of comments from Round into version v4 of the document. The Chair noted that, given the scope and conflicting nature of some inputs, the consolidation resulted in substantial restructuring and rewriting of several sections.
 - **13th meeting (15 April 2026):** Presentation of the consolidated version v7 of the guideline, incorporating comments from Round 2, and request for a final round of comments by the end of April 2026.
7. The work was supported by a series of working documents — prototype tools, AI-assisted document analyses, supporting reports, and a publicly accessible toolkit (<https://crd13.its.org.br/>) developed by Brazil to assist countries in applying the guideline concepts in practice. Recordings of all meetings and supporting materials are available in the Codex Online Forum.
8. Two formal rounds of written comments on consecutive consolidated drafts were conducted in accordance with the agreed schedule:
 - a) Round 1 (December 2025 – January 2026): comments were received from Members through earlier interventions on the draft toolkit and the consolidated draft.

- b) Round 2 (February – March 2026): comments were received from Members on version v4 of the consolidated draft, as well as comments on the substantive scope of the work.
- c) Final round (April – May 2026): comments were received from Members on version v7.

ANALYSIS OF DISCUSSIONS

9. The discussions within the EWG progressively shaped the conceptual structure, the terminology, and the scope of the guideline. The principal substantive points addressed throughout the work were as follows.

Scope and pivot from “sanitary requirements” to “sanitary attestations”

10. Early drafts of the document used the term “sanitary requirements” throughout. As the work progressed, it became apparent that the formulation of regulatory requirements and the formulation of attestations confirming that those requirements have been met are conceptually distinct activities and follow different drafting conventions. A requirement typically uses prescriptive language (e.g., “Products shall be packaged promptly”), while an attestation reports a state, result or completed action for the consignment covered by the certificate (e.g., “Products of this consignment were packaged promptly”).

11. This distinction was raised by some Members in their Round 2 comments by observing that Annex 2 of the consolidated draft, although intended to inform the drafting of attestations, was still presenting examples and writing rules expressed in the register of regulatory requirements. The Chair acknowledged this observation as well-founded, and a comprehensive revision of Annex 2 was undertaken to pivot all communicative function tables — examples, structural templates and writing rules — to the attestation register. This pivot is reflected in the final version of the document.

12. The pivot was further extended throughout the document for internal consistency, including the definitions in Section 3, illustrative examples in Section 6 (Principle A and Principle B), the predicate examples in Annex 3, and the related discussion of the drafting procedure in Principle D. The communicative function table structure was expanded to present both the regulatory requirement template and the corresponding attestation template, so that the transformation between the two registers remains visible to the drafter.

Relationship with CXG 38-2001 and scope clarifications

13. Several Members noted that the relationship between the proposed guidelines and the existing *Guidelines for design, production, issuance and use of generic official certificates* (CXG 38-2001) should be made explicit. In response, a dedicated paragraph was added to the Preamble clarifying that:
 - a) the present guidelines are intended to be read in conjunction with CXG 38-2001;
 - b) CXG 38-2001 establishes the general principles governing the structure and content of official certificates, while the present guidelines focus specifically on the standardized representation of sanitary attestations contained within such certificates; and
 - c) the present guidelines do not supersede or modify CXG 38-2001, but provide complementary operational guideline for its application in the context of attestation formulation.
14. Building on this clarification, some Members requested that the scope section be aligned with paragraph 7 of CXG 38-2001, which acknowledges that a single official certificate may cover food safety, animal health, plant health and other matters simultaneously. The scope section was accordingly revised to incorporate the exception for matters of animal and plant health directly related to food safety and the recognition that the guideline applies only to the sanitary attestations contained in certificates.
15. In earlier discussions, some Members emphasized the importance of avoiding any interpretation of the work as defining the substantive content of sanitary attestations or creating a Codex-approved list of such attestations. Subsequent revisions of Sections 1, 2 and 5 reflect this concern by maintaining a clear focus on the representation of attestations (the “how”) rather than the substantive determination of which attestations should appear in certificates (the “what”).

Structure of the guideline: human-readable core and digital annex

16. It was proposed early that the guideline should be organized in two complementary components: a main body focused on Codex-style drafting principles, and annexes addressing the digital and ontology-based aspects of structured representation. This proposal was supported by the Members and adopted as the structural framework of the document.
17. The final structure reflects this approach: Sections 1 to 6 of the main body address the framework, principles, and human-readable drafting of attestations, while Annex 1 addresses the design and drafting of machine-readable attestations, and Annexes 2 and 3 provide examples, communicative function tables, and the controlled vocabularies (predicates and metadata) used to organize and describe information clearly.

Principles and definitions

18. Section 4 of the guideline presents five principles applicable to sanitary attestations: (A) *Clarity and Consistency*; (B) *Transparency and Objectivity*; (C) *Verifiability and Auditability*; (D) *Interoperability*; and (E) *Preservation of Meaning*. The wording of Principles C and D was the subject of extensive discussion.
19. *Principle C (Verifiability and Auditability)* - Some Members observed that the wording in earlier drafts had shifted the focus too narrowly towards electronic certification systems, whereas verifiability and auditability should remain broad and technology-neutral, covering any means of verification including inspection and audit. The principle was reformulated to restore the technology-neutral framing of the original version, while preserving the recognition that structured representations can also be applied in automated verification processes where electronic certification systems are in use.
20. *Principle D (Interoperability)* - the wording was simplified to emphasize that attestations written using harmonized and structured language can facilitate interoperability, with terminology consistency and controlled vocabularies presented as supporting mechanisms rather than as defining elements of the principle.
21. The definitions in Section 3 were refined throughout the work. The definition of:
 - “Modality” was reformulated to reflect the normative force of the underlying regulatory requirement that an attestation confirms (an obligation, a prohibition, a permission, or a limit), rather than describing the attestation as if it imposed a regulatory requirement itself.
 - “Communicative function” was correspondingly adjusted to describe how the regulatory intent is expressed in the attestation, with examples in the attestation register.
 - “Sanitary Attestation” was introduced to anchor the terminology.
22. There were observations that the “condition” modality overlapped with other types (because conditions can appear in rules like obligations, prohibitions, or permissions). The conditional modality was removed, and its role was shared across other modalities through communicative functions. New communicative functions were added to show how conditions work in those categories, such as: “Suspend an obligation when a condition is met” under Obligation; “Lift a prohibition when a condition is met” under Prohibition; and “Apply a limit conditionally” and “Set alternative limits depending on circumstances” under Limits and Targets.

ANNEXES

Annex 1: Design and Drafting of Machine-Readable Sanitary Attestations

23. Annex 1 explains how to design and structure sanitary attestations so they can be understood and processed by digital systems. It focuses on using ontology-based methods to organize information clearly, reduce ambiguity, and enable automated verification, data exchange, and consistency across systems. By applying principles of verifiability, interoperability, and preservation of meaning, the annex ensures that attestations remain legally accurate while being expressed in a standardized, machine-readable format that supports reliable use by authorities and across borders.

Annex 2: Communicative function tables

24. Annex 2 was developed to provide concrete drafting support for each communicative function within each modality. The final structure presents 23 communicative function tables organized in four sections (Expressing Obligation; Expressing Permission; Expressing Prohibition; Expressing Limits and Targets). Each table presents six elements:
 - a) Communicative function: the name of the function;
 - b) Requirement example: an example of the regulatory requirement language;
 - c) Requirement structural template: the structural pattern of the regulatory requirement;
 - d) Attestation example: an example of the corresponding attestation;
 - e) Attestation structural template: the structural pattern of the attestation; and
 - f) Writing rules: practical guideline for drafting the attestation.
25. The presentation of both the requirement and the attestation templates side by side, together with corresponding examples, was adopted to make the transformation between the two registers explicit, which is of particular value to drafters working in both registers (for example, when revising existing certificates that contain regulatory-style attestations).
26. The function “List permitted items” was removed because it overlaps with “Require compliance with a standard.” This is because a certificate usually confirms that the standard is met, rather than listing every

allowed item. Instead, examples like a fixed list of allowed ingredients were moved under “Allow a substance or action.” This function now covers both single items and lists of permitted items.

Annex 3: Controlled vocabularies

27. Annex 3 provides standardized terms for the subjects or objects (e.g., “Product,” “Institution,” “Facility”) and objects (e.g., “Temperature”) to support the structured representation of attestations. It is organized in three parts: (A) entities (subjects and objects of triples); (B) predicates linking subjects to objects; and (C) metadata attributes qualifying entities. The vocabularies were derived from the pilot work conducted by Brazil and progressively refined.
28. The list of predicates was reviewed against the attestation register and found to be largely composed of past participles (expressing completed actions) and present-tense state verbs (expressing factual conditions), which are consistent with the attestation register. A few predicates were reviewed substantively:
 - a) The predicate “forbids” was removed, as attesting that a territory “forbids” something is not typical of a sanitary certificate, which attests about the consignment. The same concept is covered by “prohibitedBy” and “prohibitedIn” in the passive form, which are consistent with the attestation register.
 - b) The descriptions and examples of “prohibitedBy” and “prohibitedIn” were revised to reflect the attestation register more clearly, including the addition of further examples illustrating their typical use in attesting the regulatory basis of an absence or non-application statement about the consignment.
29. The introduction to Annex 3-B was supplemented to make explicit that predicates are formulated in the register of attestation — expressing states, results, or completed actions — consistent with the function of a sanitary attestation.

Supporting toolkit

30. In parallel with the development of the guideline, Brazil developed and made publicly available a supporting toolkit (<https://crd13.its.org.br/>) to assist competent authorities in applying the guideline in practice. The toolkit provides a workflow for: (i) extracting attestations or requirements from existing certificate text; (ii) mapping them against Codex and WOAHA references; (iii) supporting their reformulation in Codex-style attestation language; and (iv) representing them as ontology triples.
31. The toolkit was tested by several Members during the EWG's work. There was a proposal by some Members to use an alternative workflow starting from the full requirement and proceeding through mapping, reformulation, and finally breaking it into small, simple parts. Other Members reported on their experience testing the toolkit with various certificate templates and provided detailed observations on the accuracy of reference matching and the behaviour of triple generation. The toolkit was iteratively refined to reflect these observations. The Chair confirmed that the toolkit is a supporting resource and not a normative element of the guideline itself.

CONCLUSIONS

32. The EWG developed, through an iterative process of incremental drafting, virtual meetings, and three formal rounds of written comments, a draft guideline for the standardization of the representation of sanitary attestations in official certificates. The final consolidated version of the document was prepared by the Chair after incorporating, where feasible, the comments received in all rounds and through the virtual meetings.
33. The guideline is structured in two complementary components: a main body covering the conceptual framework, principles, and human-readable drafting of attestations (Sections 1 to 6); and a technical annex covering the design and drafting of machine-readable attestations (Annex 1), supported by communicative function tables (Annex 2) and controlled vocabularies (Annex 3). This structure was adopted to ensure that the guideline is accessible to officials without a technical background while providing the necessary technical depth for those involved in digital implementation.
34. The pivot from “sanitary requirements” to “sanitary attestations” as the focus of the guideline is consolidated throughout the document. This pivot, together with the explicit articulation of the relationship between the present guideline and CXG 38-2001, the technology-neutral framing of the principles, and the development of a supporting toolkit, provides a coherent foundation for the proposed guideline to be considered by CCFICS28.
35. Substantial convergence was achieved on the structure, terminology, and core content of the guideline. Some questions remain open for the consideration of CCFICS28, including the level of detail to be retained in the technical annexes, the precise wording of certain communicative function tables, and the relationship to be reflected with related ongoing work by other international organizations (notably WOAHA).

RECOMMENDATIONS

36. In view of the above, the EWG Chair recommends CCFICS28 consider:
- a) the proposed Guidelines for the standardization of the representation of sanitary attestations in official certificates (**Appendix I**);
 - b) advancing the proposed guidelines to the next step in the Codex elaboration procedure, as appropriate; and
 - c) how the supporting toolkit developed by Brazil (under paragraph 30 and 31) may assist competent authorities to apply the guideline, once finalized, and whether it should be referenced as a supplementary resource.

DRAFT GUIDELINES FOR STANDARDIZATION OF THE REPRESENTATION OF SANITARY ATTESTATIONS IN OFFICIAL CERTIFICATES

(Step 3)

Section 1 Preamble

Current practices for negotiating and developing attestations, when needed, sometimes lead to ambiguity, duplication, or inconsistent interpretation. Such challenges can affect the negotiation of new certificates, the revision of existing ones, and the efficient implementation of certification systems. Consistency in the formulation of attestations across certificates and contexts may facilitate their reuse, reduce duplication, and support mutual understanding between competent authorities.

These guidelines aim to promote a more structured and uniform way of representing attestations, improving their readability, verifiability, and mutual understanding between competent authorities, providing guideline on the representation of attestations that have already been agreed, or are under negotiation, between the competent authorities of importing and exporting countries.

These guidelines are intended to be read in conjunction with the Guidelines for Design, Production, Issuance and Use of Generic Official Certificates (CXG 38-2001), which provide the normative framework for the design and use of official certificates in international food trade. While CXG 38-2001 establishes the general principles governing the structure and content of official certificates, the present guidelines focus specifically on the standardized representation of sanitary attestations contained within such certificates. They do not supersede or modify CXG 38-2001 but provide complementary operational guideline for its application in the context of attestation formulation.

While digital systems may benefit from the structured approach proposed in this document, the guidelines themselves remain technology-neutral, only providing a foundation that support future digital implementation, without prescribing specific technology solutions.

Competent authorities may benefit from complementary guideline, including examples, or tools to support the consistent application of these principles in different regulatory and operational contexts.

Section 2 Scope and objectives

These guidelines are intended to provide practical guideline for competent authorities to simplify and standardize the development, revision, negotiation, agreement, and representation of attestations in official certificates in a clear, consistent, and structured manner – while recognizing that competent authorities differ in their regulatory frameworks, resources, and levels of digital implementation.

The guideline will help to ensure that such attestations, when necessary, are easily understood, verifiable, and aligned with Codex principles, thereby reducing the risk of misinterpretation.

These guidelines are also intended to support:

- More efficient development and implementation of both paper-based and electronic certification systems.
- Future interoperability with digital systems, where structured representation of attestations may facilitate automated attestation validation.
- The use of examples or supplementary guideline materials to assist competent authorities in applying these principles in practice.

These guidelines do not provide a basis for establishing sanitary attestations that include information beyond that which is agreed as necessary to provide food safety assurance. They also are not intended to address matters relating to fair practices in the food trade or matters of animal or plant health, unless directly related to food safety. It is recognized that, in practice, a single official certificate may contain information relevant to several matters, such as food safety and animal and plant health; in such cases, these guidelines apply only to the sanitary attestations contained therein.

The application of these guidelines:

- Supports transparency, clarity, and consistency in certification practices, and facilitates both paper-based and electronic certification processes.
- May be adapted progressively, taking into account national capacities, legal frameworks, and operational environments.

Section 3 Definitions

For the purposes of these guidelines:

Sanitary attestation is a statement contained in an official certificate confirming that food safety requirements are met.

Modality refers to the type of regulatory requirement from which an attestation originates (e.g., obligation, prohibition, permission, or limit). While attestations are expressed as declarations of verified facts, understanding the underlying regulatory modality supports the identification of the appropriate communicative function and drafting pattern. In this sense, the modality functions as analytical metadata describing the normative origin of an attestation, rather than a linguistic property of the attestation itself, which always declares a verified fact.

Communicative function refers to the specific way in which the intent of an attestation is expressed in practice. Within a given modality, different communicative functions refine how the regulatory intent is expressed in the attestation – for example, within the modality of obligation, an attestation may confirm that an action was performed or a state achieved, that compliance with a standard was met, that precautionary measures were taken, or that responsibility was discharged by a designated agent. Identifying the communicative function of an attestation is essential to selecting the appropriate drafting pattern.

Ontology means a structured representation of knowledge within a defined domain, consisting of concepts and the relationships between them, enabling a shared and consistent understanding of terminology.

Ontology-based method means the use of an ontology to organize and express attestations in a consistent and unambiguous manner, supporting both human interpretation and structured representation.

Semantic standardization means the process of ensuring that terms and expressions used in attestations have a consistent and agreed meaning across certificates, contexts, and competent authorities.

Syntactic standardization means the process of ensuring that terms and expressions used in attestations follow a harmonized structure and format, facilitating their comparison and automated verification.

Triple is a simple sentence that tells something about the world using three parts: a subject (who or what we are talking about), a predicate (the semantic relationship that links the subject to the object), and an object (who or what it is about). For example, in the sentence “Milk is free from diseases”, milk is the subject, free from is the predicate, and diseases is the object.

Interoperability is the ability of different systems, devices, or software applications to communicate, exchange data, and use the information that has been exchanged accurately and meaningfully. It enables seamless cooperation between technologies.

Section 4 Principles

The following principles apply to sanitary attestations included in official certificates:

A Clarity and consistency

Attestations should be expressed in clear, concise, and standardized language. The structure and terminology used should promote consistent interpretation by competent authorities of both importing and exporting countries.

B Transparency and objectivity

The expression of the attestations should be clear and unambiguous, so that their meaning can be consistently understood and interpreted in the same way by competent authorities.

C Verifiability and auditability²

Attestations can be formulated so that compliance can be verified and audited. They should be stated in measurable or observable terms where possible and presented in a structure that supports their verification, including through the use of electronic systems. Where electronic certification systems are used, attestations may also be formulated to enable automated verification processes, including the use of machine-interpretable attestation codes and data models that allow attestations to be derived from validated digital records. Codification of attestations linked to structured data sources fosters verifiability and auditability, increasing trust among competent authorities and trading partners.

² For detailed explanation, refer to Annex 1.

D Interoperability³

Attestations written using harmonized and structured language can facilitate interoperability. Terminology should be consistent across certificates, so that attestations can be understood and applied in the same way by the competent authorities of both importing and exporting countries. Where electronic certification systems are used, the use of controlled vocabularies and well-defined semantic relationships supports the exchange and comparison of attestation data across platforms and jurisdictions.

E Preservation of meaning⁴

The use of structured representations shall not alter the substance, scope or regulatory intent of existing attestations. Such representations should provide a standardized, machine-interpretable format that preserves the authoritative meaning of the human-readable text, while supporting integration with upstream data collected throughout the supply chain and digital transformation of official certification processes.

Section 5 Essential criteria for the standardized representation of attestations

5.1 Foundational principles

Principles A (clarity and consistency) and B (transparency and objectivity) form the foundation for the representation of sanitary attestations (detailed in Section 6). Together, they establish a clear, coherent, and human-readable format. These principles focus on linguistic precision, shared understanding, and the explicit communication of regulatory intent.

Only when principles A and B are effectively applied can the subsequent principles be meaningfully implemented.

Principles C (verifiability and auditability), D (interoperability) and E (preservation of meaning) build upon this foundation to enable the transformation of attestations into a machine-readable format (detailed in Annex 1). These principles rely on the prior clarification and standardization of attestations to ensure that structured representations, codification, and semantic tools accurately reflect the authoritative human-readable text.

5.2 Application in certificate design

When applying the principles outlined in Section 4, competent authorities should consider the overall function of the certificate and the specific assurance required by the importing country. Attestations should be assessed both individually and collectively to ensure that they contribute effectively to food safety without introducing unnecessary complexity or ambiguity.

When developing or revising certificates, competent authorities should review systematically existing attestations to identify duplication, inconsistency or ambiguity, and replace them, where feasible, with standardized and clearly formulated statements.

5.3 Formulation of attestations

Each attestation should include only a single, clearly identifiable statement. Whenever feasible, attestations should be expressed as distinct statements rather than compound sentences, in order to facilitate interpretation, transparency, and validation. The use of controlled vocabularies, ontologies, or other semantic tools can support machine readability and exchange across digital platforms, without altering the regulatory intent.

Standardized attestations should be worded in a clear, concise and unambiguous manner, accurately reflecting the agreed sanitary assurances and avoiding unnecessary repetition or complexity.

The terminology used in attestations should be consistent with Codex standards and other relevant international references, where available. Where multiple terms exist for the same concept, a single standardized term should be selected and applied consistently throughout the certificate.

Attestations should be formulated in a manner that enables their verification through official inspection, certification activities, or, where applicable, automated processes within electronic certification systems.

5.4 Structuring and semantic consideration

Attestations should be formulated using harmonized syntax and semantics, supported, where appropriate, by ontology-based approaches.

The use of controlled vocabularies, ontologies, or other semantic tools can support machine readability and exchange across digital platforms, without altering the regulatory intent.

³ For detailed explanation, refer to Annex 1.

⁴ For detailed explanation, refer to Annex 1.

Where attestations include quantitative parameters (such as temperature, time, residue limits), such parameters should be expressed using internationally recognized units and standardized formats to ensure consistency and compatibility with electronic systems.

5.5 Scope and applicability of attestations

Efforts should be made to include only attestations that are applicable to the product – where appropriate, linked to the applicable Harmonized System (HS) code – and minimize the use of manual deletions and strikethroughs of attestations where possible.

5.6 Preservation of meaning and validation

The structured representation of attestations should not alter their substantive meaning. The purpose is to enhance clarity, consistency, comparability, and digital interoperability, while fully preserving the original intent and regulatory scope of each attestation.

Regardless of the degree of structure or digital representation applied, human validation remains essential throughout the process of developing, revising, and implementing attestations. Competent authorities should ensure that each attestation accurately reflects the intended regulatory requirement, aligns with the identified modality and communicative function, and preserves the legal equivalence of the authoritative human-readable text.

Section 6 Design and drafting of human-readable sanitary attestations

This section provides specific guideline on the design and drafting of sanitary attestations for inclusion in official certificates in a manner that is:

- clear and easy to understand;
- consistent across certificates and trading partners;
- suitable for verification and audit; and
- capable of being represented in a structured or digital form if required in the future.

It builds upon the principles A (clarity and consistency) and B (transparency and objectivity) set out in Section 4, and the application criteria described in Section 5.

The criteria below are intended primarily for:

- certificate drafters and revisers;
- policy and regulatory officers;
- officials involved in certificate negotiation; and
- competent authorities responsible for implementation and oversight.

The guideline is intended to be used in a manner that is both human-readable and suitable for subsequent structured or digital representation, without prescribing specific wording or formats.

While the guideline in this section remains technology-neutral, it provides a foundation for structured or ontology-based representations of attestations. Additional guideline, including examples or tools, may support competent authorities in the consistent application of these criteria and the underlying principles.

Principle A Clarity and consistency

In applying the principle of clarity and consistency, attestations should be assessed to ensure that their meaning is easily understood and interpreted in the same way by all parties.

A1 Identification of semantic units

Each sanitary attestation should be treated initially as a single semantic unit. This unit may include one or more clauses, as long as they collectively serve one communicative function within a single modality (obligation, prohibition, permission, or limit).

A semantic unit may consist of one or more clauses, provided they collectively serve a single communicative function within a single modality (for example obligation, prohibition, permission, or limit).

A2 Identification of key attestation elements

Key attestation elements define the scope and intent of an attestation. These include, but are not limited to:

- commodity or product category;
- hazard, disease, or assurance domain (such as food safety, hygiene, residue control);

- regulated activity or process (such as production, processing, treatment, inspection); and
- temporal or spatial qualifiers.

Example: “Dairy products of this consignment were kept at or below 5 °C during transport.”

- Commodity or product category: dairy products.
- Regulated activity: transport.
- Condition/parameter constraint: kept at or below 5 °C.

Correct identification of key attestation elements is essential to ensure clarity, prevent over-inclusion of conditions, and enable consistent interpretation.

A3 Determination of modality and communicative function

The representation of an attestation can be understood in two layers:

- Layer 1 - the regulatory origin: the normative requirement that gives rise to the attestation, the type of which is captured by its modality.
- Layer 2 - the representation itself: the way that regulatory origin is expressed in the certificate, always as a declaration of a verified fact.

The modality is therefore retained as analytical metadata describing the normative origin of an attestation, without changing its factual nature.

Each sanitary attestation declares a verified fact, and the type of regulatory requirement from which it originates is identified by its modality. Identifying the modality of an attestation is a key step in its design, as it determines the appropriate sentence structure, choice of verb forms, and overall formulation of the statement.

The modality defines the strength and nature of the requirement, indicating whether an attestation establishes an obligation, prohibition, permission, or limit.

Examples of modalities, communicative functions, and corresponding templates are provided in Annex 2, created using Codex terms and harmonized vocabulary.

Common modalities include:

Modality (Layer 1: regulatory origin)	Regulatory intent (Layer 1)	Attestation (Layer 2: factual representation)
Obligation	Something that must be done	The product is safe for human consumption
Prohibition	Something not allowed	The product does not contain antibiotics
Permission	Something allowed	Substance X was used in the processing of this product
Limit/target	Quantitative or measurable	The process achieved a 5-log reduction of Salmonella

Communicative functions further refine the modality of an attestation by specifying how the regulatory intent is applied in practice. For example, within the modality of obligation, an attestation may:

- mandate an action, state or requirement;
- require compliance with a standard, limit or criterion;
- order precautionary measures; or
- assign responsibility to a competent authority, operator, or third-party assessor.

Example: “The product is safe for human consumption.”

- Modality: Obligation – the attestation confirms that the regulatory requirement to ensure safety has been met.
- Communicative function: mandate an action or state.

Conditional elements may be incorporated into any of these modalities. They define the scope or circumstances of an attestation’s application and are expressed through the communicative functions. The suggested list of modalities and communicative functions is provided in Annex 2.

Where appropriate, the use of predefined structures and templates can facilitate harmonization, reduce ambiguity, and support future digital implementation, without altering the regulatory intent of the attestation.

Each communicative function can be associated with recognizable linguistic patterns that support standardized drafting and consistent interpretation.

Standardized templates may be used to express attestations in a structured and harmonized manner. Templates define a general pattern for an attestation, including placeholders for key elements such as the subject, action, condition, limit, or reference, as in the example below:

Modality	Obligation
Communicative function	Require compliance with a standard, limit, or criterion
Pattern/template	<Subject>; complies with <Standard>
Attestation	Products comply with the maximum residue limits established by the Codex Alimentarius Commission

For practical purposes, replace the placeholders with the concrete elements of the attestation (subject, action, substance, limit, location, etc.).

The 6-step drafting procedure can support the creation of a clear, concise, and standardized formulation of attestations:

1. Identify the modality of the attestation (obligation, prohibition, etc.).
2. Select the relevant pattern based on communicative function, if appropriate.
3. Substitute the placeholders with concrete elements (subject, action, limit, etc.).
4. Review the outcome for clarity and conciseness.
5. Assess if the terminology aligns with Codex and relevant international standards.
6. Review the final sentence to ensure it is direct, unambiguous, and avoids unnecessary technical jargon.

For clarity and consistency, competent authorities should ensure that attestations:

- are written in clear and direct language, minimizing the use of subordinate clauses, technical jargon, and complex sentence structures;
- express a single idea or assurance, avoiding the combination of multiple conditions or requirements in a single statement;
- group related clauses into a single attestation when they express one assurance. Avoid fragmenting content in ways that cause duplication, ambiguity, or loss of context;
- use terminology consistently throughout the certificate, in line with Codex standards and other relevant international references;
- avoid ambiguous or open-ended expressions that could give rise to differing interpretations; and
- retain only elements essential to the communicative function and regulatory intent. Remove redundant, implied, or non-essential clauses to improve clarity and ease of validation.

Principle B Transparency and objectivity

In applying the principle of transparency and objectivity, attestations should be formulated so that their rationale, scope and implications are clear.

B1 Break into separate attestations

Breaking complex attestations into separate, well-defined units is essential to ensure clarity, transparency, and effective regulatory interpretation. When multiple conditions, practices or assurances are combined into a single statement, important details may become implicit, ambiguous, or difficult to verify.

Separating attestations allows each assurance to express one clear communicative function, making it easier to understand what is being declared, required, or verified. This structure improves traceability by enabling each unit to be individually assessed, referenced, and validated against relevant standards or scientific sources.

Clear separation also supports consistent application by both importing and exporting authorities, reducing the risk of divergent interpretations. This allows authorities to identify precisely which requirement applies and whether it has been met.

Finally, structuring attestations into distinct units facilitates digital processing, interoperability, and future automation, as each unit can be mapped, analysed, and reused independently. This approach strengthens both human readability and machine interpretability, contributing to more robust and transparent certification systems.

Example (original): “The products of this consignment were obtained in hygienic conditions in establishments that implemented GMP, SSOP, and HACCP, with systematic verification by the Official Veterinary Service”.

Example (split for objectivity):

- i. Products of this consignment were obtained in hygienic conditions.
- ii. Establishments implemented good manufacturing practices (GMP).
- iii. Establishments implemented sanitation standard operating procedures (SSOP).
- iv. Establishments implemented hazard analysis and critical control points (HACCP).
- v. Establishments were subject to systematic verification by the Official Veterinary Service.

B2 Mapping to Codex references

Mapping clarified and structured attestations to Codex references is intended to support competent authorities in ensuring that regulatory language is both scientifically grounded and internationally harmonized. This process allows authorities and stakeholders to demonstrate that the statements included in official documents are aligned with internationally recognized standards.

The first step involves identifying the relevant Codex texts that support the regulatory intent and communicative function of the attestation. This ensures that the content is backed by authoritative guideline and reflects best practices in food safety, hygiene, and public health.

Next, the mapping explicitly connects the attestation to these Codex references. This link serves two key purposes:

- It provides justification, showing the scientific and regulatory rationale behind each requirement.
- It enhances transparency, especially in the context of international trade, where mutual understanding and trust are essential.

By embedding the Codex reference directly in the attestation’s logic, the mapping process facilitates compliance verification, supports digital transformation efforts, and strengthens regulatory coherence across jurisdictions.

For transparency and objectivity, competent authorities should ensure that attestations:

- are expressed in objective, observable, or measurable terms;
- can be understood without requiring implicit knowledge of national practices;
- avoid vague or subjective wording (for example “adequate”, “sufficient”, “appropriate”) unless accompanied by clearly defined criteria or references; and
- have a single, unambiguous meaning that can be consistently applied by both importing and exporting authorities.

Section 7 Notes and references

These guidelines have been developed in conjunction with the normative foundation laid down in the following Codex texts:

- Principles for Food Import and Export Inspection and Certification (CXG 20-1995).
- Guidelines for the Design, Operation, Assessment and Accreditation of Food Import and Export Inspection and Certification Systems (CXG 26-1997).
- Guidelines for Design, Production, Issuance and Use of Generic Official Certificates (CXG 38-2001).

The methodological background for the development and application of ontology-based methods can be found in:

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- Gruber, T. 1995. Toward Principles for the Design of Ontologies Used for Knowledge Sharing. *International Journal of Human-Computer Studies*, 43(5–6), 907–928.
 - Studer, R., Benjamins, V. & Fensel, D. 1998. Knowledge Engineering: Principles and Methods. *Data & Knowledge Engineering*, 25(1–2), 161–197.
 - Forbes, D.E. *et al.* 2018. *Ontology Engineering Applications in Healthcare and Workforce Management Systems*. Springer International Publishing.

ANNEX 1

Design and drafting of machine-readable sanitary attestations

One approach to structured representation involves the use of ontology-based methods to express formally the elements and relationships contained in a sanitary attestation.

Use of ontology-based methods plays a critical role in the structured representation of sanitary attestations, enabling verifiability, auditability and interoperability in digital certification systems. Ontologies allow concepts to be formally expressed in a standardized and machine-readable way, using structured relationships that preserve the regulatory meaning and support automated validation.

In addition, ontology-driven representations enable attestations to be digitally linked to authoritative references and regulatory frameworks. This linkage ensures that attestations can be interpreted and verified consistently by competent authorities or third-party assessors, and enables the exchange of certification data across borders and platforms, in alignment with international standards and digital transformation goals.

In this context, ontology-based methods provide a way to:

- organize concepts and relationships consistently;
- reduce ambiguity in terminology;
- support machine-interpretable representations without altering regulatory meaning; and
- reflect the functional relationship between the attestation and the underlying data.

Principle C Verifiability and auditability

In applying the principle of verifiability and auditability, clarified attestations should be represented in a structured form to support verification through the use of digital tools.

By breaking down attestations into fundamental components (typically represented as subject–predicate–object triples), ontology-based approaches ensure that the core intent of each attestation is explicitly defined. This structured format enhances semantic precision, avoids reliance on informal interpretation, and enables the reuse of standard terms across different certification contexts.

For illustration, the relationships in the example below may be expressed as simple statements composed of a subject, a predicate, and an object (for example, product – comes from – establishment). Such representations allow complex textual attestations to be expressed in a standardized form suitable for verification and interoperability.

Example (original): “Products of this consignment were obtained from establishments that implemented good manufacturing practices (GMP), sanitation standard operating procedures (SSOP) and hazard analysis and critical control points (HACCP).”

Ontology-based representation (triple):

- PRODUCTS; OBTAINED_FROM; ESTABLISHMENTS
- ESTABLISHMENTS; IMPLEMENT; GMP
- ESTABLISHMENTS; IMPLEMENT; SSOP
- ESTABLISHMENTS; IMPLEMENT; HACCP

In this structure:

- products is the subject, representing the entity being described;
- obtained from is the predicate, indicating a semantic relationship;
- establishments (*that implemented* GMP, SSOP and HACCP) is the object; and
- implement expresses compliance relationships between establishments and GMP, SSOP, and HACCP.

The 2-step conversion procedure can support the creation of ontology-based representation:

1. Identify the essential components of the attestation, including the subject (entity concerned), the predicate (relationship or condition), and the object (entity, condition, or assurance provided).
2. Express each assurance as one or more structured statements reflecting the original attestation. Where multiple conditions apply, these may be represented as separate but related statements.

Principle D Interoperability

In applying the principle of interoperability, structured attestations should be represented by using controlled vocabularies and well-defined semantic relationships.

In the context of structured and digital certification systems, consistency in terminology allows for efficient data exchange across platforms. Standardized vocabularies – often drawn from internationally recognized sources, controlled tables, or sector-specific glossaries – ensure that each term carries a precise and agreed-upon meaning. This eliminates ambiguity, reduces the risk of misinterpretation, and supports alignment with legal and technical frameworks (illustrative vocabularies and examples are provided in Annex 3).

This involves ensuring the triples follow syntactic rules (for example, consistent naming conventions) and are compatible with systems that can process these triples.

The 5-step standardization procedure can support the creation of harmonized ontology-based representation:

1. Replace the conceptual entity with its category (e.g. Establishments → Facility); Milk → Product).
2. Represent specific conceptual entities as attributes (e.g. Facility #type(Establishments); Product #type(Milk)).
3. Apply the root form, or the dictionary form, of the word (e.g. Products → Product; has → have).
4. Replace synonyms with the preferred term (e.g. must be obtained → comesFrom).
5. Ensure predicates are expressed in the affirmative attestation form, converting normative constructions into statements about states or completed actions (e.g. does not contain → freeFrom).

For illustration, the ontology-based representation from principle C adapted to principle D, where:

- “Product” instead of “Products”.
- *Establishment* became a type of FACILITY.
- GMP, SSOP, and HACCP became practices applied.
- “Comes from” became “comesFrom”, a way of writing words all together without spaces, that each new word start with a capital letter (except the first one), also known as camel case.⁵

Example (result): PRODUCT comesFrom FACILITY #type(Establishment) #practice(GMP) #practice(SSOP) #practice(HACCP)

Once these steps are completed, the triples can be used in automated reasoning, searching, or data exchange systems across different platforms and formats.

Principle E Preservation of meaning

Human validation remains essential to confirm correctness, relevance, and regulatory intent. Structured representations should be validated to ensure that they:

- accurately capture the meaning and scope of the original attestation;
- are consistent with the identified communicative function; and
- preserve legal equivalence with the authoritative text.

Structured representation supports, but does not replace, the authoritative human-readable text of the attestation.

⁵ Camel case is a convention in which words are joined without spaces and each word after the first is capitalized (e.g., *comesFrom*, *freeFrom*). This notation supports machine readability and ensures compatibility with digital processing systems.

ANNEX 2

Tables to support communicative function

Expressing obligation

<u>Communicative function: Mandate an action or state</u>	
<u>Requirement example</u>	<u>Products shall be packaged promptly.</u>
<u>Requirement pattern</u>	<u><Subject> shall/must <verb phrase indicating required action>.</u>
<u>Attestation example</u>	<u>Products of this consignment were packaged promptly.</u>
<u>Attestation structural template</u>	<u><Subject of this consignment> <verb in past tense / present state> <complement>.</u>
<u>Representation rules</u>	<u>Use this function when the certificate attests that an action was carried out or that a required state has been achieved.</u> <u>To construct the attestation:</u> <u>Identify the subject and link it explicitly to the consignment (e.g. “Products of this consignment”, “The product”).</u> <u>Use the past tense for actions that took place (“were packaged”) or the present tense for current states.</u> <u>State the action or state in factual terms, without modal verbs of obligation (shall, must).</u> <u>Do not use this function for setting limits, granting permissions, or describing prohibitions.</u>
<u>Communicative function: Require compliance with a standard, limit, or criterion</u>	
<u>Requirement example</u>	<u>Products shall comply with the maximum residue limits established by the Codex Alimentarius Commission.</u>
<u>Requirement pattern</u>	<u><Subject> shall/must comply with <reference standard or criterion>.</u>
<u>Attestation example</u>	<u>Products of this consignment comply with the maximum residue limits established by the Codex Alimentarius Commission.</u>
<u>Attestation structural template</u>	<u><Subject of this consignment> complies with <reference standard or criterion>.</u>
<u>Representation rules</u>	<u>Use this function when the attestation confirms conformity with a named standard, limit, or criterion.</u> <u>To construct the attestation:</u> <u>Identify the subject and link it to the consignment.</u> <u>Use “complies with” (present tense) as the operative phrase.</u> <u>Cite the standard, limit, or criterion exactly as it appears in the regulatory source.</u> <u>Do not use this function when no external reference is invoked; in that case use “Mandate an action or state”.</u>
<u>Communicative function: Order precautionary measures</u>	
<u>Requirement example</u>	<u>Precautions shall be taken to prevent contamination from moisture.</u>

<u>Requirement pattern</u>	<u>Precautions/measures shall/must be taken to <verb phrase indicating purpose>.</u>
<u>Attestation example</u>	<u>Precautions were taken during the production of this consignment to prevent contamination from moisture.</u>
<u>Attestation structural template</u>	<u>Precautions/measures were taken <during the production of this consignment> to <verb phrase indicating purpose>.</u>
<u>Representation rules</u>	<u>Use this function when the attestation confirms that preventive measures were taken to avoid a hazard or undesirable outcome.</u> <u>To construct the attestation:</u> <u>Begin with “precautions” or “measures”.</u> <u>Use the past tense (“were taken”).</u> <u>Link the measures to the consignment by referring to the production, storage, or transport context.</u> <u>Specify the purpose with an infinitive (“to prevent...”, “to avoid...”).</u> <u>Do not use this function when a specific action is mandated; that case calls for “Mandate an action or state”.</u>
<u>Communicative function: Set conditional acceptance or rejection</u>	
<u>Requirement example</u>	<u>No raw material shall be accepted if known to contain toxic substances.</u>
<u>Requirement pattern</u>	<u>No <subject> shall be accepted/rejected if/when <condition>.</u>
<u>Attestation example</u>	<u>Raw materials used in this consignment were accepted only after verification that they did not contain toxic substances.</u>
<u>Attestation structural template</u>	<u><Subject> used/applied in this consignment were/was accepted only after <verification of the condition>.</u>
<u>Representation rules</u>	<u>Use this function when the attestation confirms that acceptance occurred conditioned on a prior verification.</u> <u>To construct the attestation:</u> <u>Identify the subject (raw materials, batches, components) and link it to the consignment.</u> <u>Use the past tense (“were accepted”, “was accepted”).</u> <u>Express the conditional element by reporting that a verification took place (“only after verification that...”).</u> <u>Make the condition that was verified unambiguous.</u> <u>Do not use this function for general prohibitions; use “Ban a substance or exceeding a limit” instead.</u>
<u>Communicative function: Assign responsibility to an agent</u>	
<u>Requirement example</u>	<u>Competent authorities must implement a water-safety management plan in accordance with current regulations.</u>
<u>Requirement pattern</u>	<u><Agent> shall/must <verb phrase indicating required action>.</u>
<u>Attestation example</u>	<u>The competent authority implemented a water-safety management plan in accordance with current regulations applicable to this consignment.</u>

<u>Attestation structural template</u>	<u><Named agent> <verb in past tense> <action> applicable to this consignment.</u>
<u>Representation rules</u>	<u>Use this function when the attestation identifies the responsible agent who carried out the required action.</u> <u>To construct the attestation:</u> <u>Begin with the named agent (e.g. “The competent authority”, “The operator”).</u> <u>Use the past tense for completed actions.</u> <u>Link the action to the consignment (“applicable to this consignment”, “for this consignment”).</u> <u>Do not use this function when the subject is the product or process; in that case use “Mandate an action or state”.</u>
<u>Communicative function: Suspend an obligation when a condition is met</u>	
<u>Requirement example</u>	<u>Heat treatment is not required provided that an equivalent process has been certified by the competent authority.</u>
<u>Requirement pattern</u>	<u><Obligation> is not required, provided that <condition>.</u>
<u>Attestation example</u>	<u>Heat treatment was not applied to this consignment because an equivalent process, certified by the competent authority, was used.</u>
<u>Attestation structural template</u>	<u><Obligation> was not applied to this consignment because <equivalent measure/condition met>.</u>
<u>Representation rules</u>	<u>Use this function when the attestation confirms that an otherwise-mandatory obligation was suspended because a specific condition was met.</u> <u>To construct the attestation:</u> <u>State that the obligation was not applied to the consignment, in the past tense.</u> <u>Introduce the justification with “because” followed by the condition that justified the suspension.</u> <u>Make the condition unambiguous and verifiable.</u> <u>Do not use this function for outright permissions; use “Allow a substance or action” instead.</u>

Expressing permission

<u>Communicative function: Allow a substance or action</u>	
<u>Requirement example</u>	<u>Natural flavouring substances may be used in products covered by this standard.</u>
<u>Requirement pattern</u>	<u><Subject> may be used/may <verb phrase indicating permitted action>.</u>
<u>Attestation example</u>	<u>Natural flavouring substances were used in this consignment in accordance with standard XYZ.</u> <u>Alternatively, when applicable: Only ingredients permitted by standard XYZ – starter cultures of harmless microorganisms, sodium chloride, and potable water – were used in this consignment.</u>
<u>Attestation structural template</u>	<u><Permitted substance/action> was used in this consignment in accordance with <reference standard>. OR (closed list): Only ingredients permitted by <reference standard> – <enumerated list> – were used in this consignment.</u>

<u>Representation rules</u>	<u>Use this function when the attestation confirms that a permitted substance, ingredient, or action was used in accordance with the applicable standard.</u> <u>To construct the attestation:</u> <u>Identify the substance or action and state, in the past tense, that it was used in the consignment.</u> <u>Cite the standard under which the permission applies.</u> <u>When the permission is restricted to a closed list of items, the attestation may enumerate them after “Only ... – list – were used”.</u> <u>Do not use this function for permissions that depend on a condition; use “Give permission with a condition”.</u>
<u>Communicative function: Give permission with a condition</u>	
<u>Requirement example</u>	<u>Allergenic ingredients may be added only if cross-contact is prevented.</u>
<u>Requirement pattern</u>	<u><Subject> may be <verb phrase> only if/when/provided that <condition>.</u>
<u>Attestation example</u>	<u>Allergenic ingredients were added to this consignment under an allergen control system designed to prevent cross-contact.</u>
<u>Attestation structural template</u>	<u><Subject> were/was <verb in past tense> in/to this consignment under <control system/condition met>.</u>
<u>Representation rules</u>	<u>Use this function when the attestation confirms that the permitted action took place and the required condition was satisfied.</u> <u>To construct the attestation:</u> <u>State, in the past tense, that the permitted action occurred in the consignment.</u> <u>Express the condition as a control measure or arrangement that was in place (“under an allergen control system”, “with documented verification”).</u> <u>Make the condition that was satisfied verifiable.</u> <u>Do not use this function for unconditional permissions; use “Allow a substance or action”.</u>
<u>Communicative function: State an exception clause</u>	
<u>Requirement example</u>	<u>Except for salted fish, sodium benzoate may be used at up to 200 mg/kg</u>
<u>Requirement pattern</u>	<u>Except for <excluded item>, <subject> may <verb phrase>.</u>
<u>Attestation example</u>	<u>Sodium benzoate was used in this consignment at a level not exceeding 200 mg/kg, in accordance with the applicable exception clause.</u>
<u>Attestation structural template</u>	<u><Subject> was used in this consignment <within applicable limit>, in accordance with the applicable <exception clause/standard>.</u>
<u>Representation rules</u>	<u>Use this function when the attestation reports use of a substance under a permission that is subject to an exception clause in the regulation.</u> <u>To construct the attestation:</u> <u>State that the subject was used in the consignment, in the past tense.</u> <u>Express any quantitative limit (“not exceeding X”, “at a level of Y”).</u>

	<u>Reference the regulatory basis ("in accordance with the applicable exception clause" or naming the standard).</u> <u>The attestation itself does not need to repeat the excluded category, since the certificate scope is already defined by the consignment.</u> <u>Do not use this function for outright prohibitions; use "Ban a substance or exceeding a limit".</u>
<u>Communicative function: Authorize an action through a responsible agent</u>	
<u>Requirement example</u>	<u>The competent authority may approve recirculated water for food processing.</u>
<u>Requirement pattern</u>	<u><Authorized agent> may <verb phrase>.</u>
<u>Attestation example</u>	<u>The competent authority approved the use of recirculated water in the processing of this consignment.</u>
<u>Attestation structural template</u>	<u><Authorized agent> approved/authorized <action> in/for this consignment.</u>
<u>Representation rules</u>	<u>Use this function when the attestation confirms that an action was carried out under the authorization of a specific responsible agent.</u> <u>To construct the attestation:</u> <u>Begin with the authorized agent (e.g. "The competent authority").</u> <u>Use the past tense ("approved", "authorized").</u> <u>State the action and link it to the consignment.</u> <u>Do not use this function for general permissions that any operator can use; use "Allow a substance or action".</u>

Expressing prohibition

<u>Communicative function: Ban a treatment or condition</u>	
<u>Requirement example</u>	<u>The product shall not be treated with ionizing irradiation.</u>
<u>Requirement pattern</u>	<u><Subject> shall not be <past participle of treatment/action>.</u>
<u>Attestation example</u>	<u>The product was not treated with ionizing irradiation.</u>
<u>Attestation structural template</u>	<u><Subject of this consignment> was/were not <past participle of treatment/action>.</u>
<u>Representation rules</u>	<u>Use this function when the attestation confirms that a specific treatment or condition was not applied.</u> <u>To construct the attestation:</u> <u>Begin with the subject (the product, the raw material, the batch).</u> <u>Use the past tense in the negative form ("was not treated", "were not exposed").</u> <u>Be specific about what was not done.</u> <u>Do not use this function for substance-level prohibitions; use "Ban a substance or exceeding a limit".</u>

<u>Communicative function: Ban a substance or exceeding a limit</u>	
<u>Requirement example</u>	<u>The product shall not contain histamine above 20 mg/kg.</u>
<u>Requirement pattern</u>	<u><Subject> shall not contain <substance> above <limit>.</u>
<u>Attestation example</u>	<u>The product does not contain histamine above 20 mg/kg.</u>
<u>Attestation structural template</u>	<u><Subject of this consignment> does not contain <substance> above <limit>.</u>
<u>Representation rules</u>	<u>Use this function when the attestation confirms absence of a substance, or that a maximum limit is not exceeded.</u> <u>To construct the attestation:</u> <u>Begin with the subject (the product, the batch).</u> <u>Use “does not contain” in the present tense.</u> <u>State the substance and, when applicable, the maximum acceptable level.</u> <u>Do not use this function for treatments or activities; use “Ban a treatment or condition”.</u>
<u>Communicative function: Ban storage, placement, or association</u>	
<u>Requirement example</u>	<u>Containers are not to be placed directly on the floor.</u>
<u>Requirement pattern</u>	<u><Subject> are/is not to be <past participle of placement> + <location/condition>.</u>
<u>Attestation example</u>	<u>During storage and transport of this consignment, product containers were not placed directly on the floor of the storage or transport unit, in accordance with hygiene requirements.</u>
<u>Attestation structural template</u>	<u>During <storage/transport/handling> of this consignment, <subject> were/was not <past participle of placement> + <forbidden location/condition>.</u>
<u>Representation rules</u>	<u>Use this function when the attestation confirms that the consignment was not stored, placed, or associated with something else during the operational context covered by the certificate.</u> <u>To construct the attestation:</u> <u>Begin by establishing the operational context (“During storage and transport of this consignment”).</u> <u>Identify the subject and use the past tense in the negative form (“were not placed”).</u> <u>Specify the forbidden location, association, or condition.</u> <u>Reference the applicable regulatory basis when relevant.</u> <u>Do not use this function for absence of treatments or substances; use the corresponding “Ban” functions.</u>
<u>Communicative function: Exclude risky persons, practices, or materials</u>	
<u>Requirement example</u>	<u>No raw material shall be accepted if known to contain parasites.</u>
<u>Requirement pattern</u>	<u>No <subject> shall be <verb phrase> if/when <risk condition>.</u>

<u>Attestation example</u>	<u>No raw material known to contain parasites was used in this consignment.</u>
<u>Attestation structural template</u>	<u>No <subject> known/identified to <risk condition> was/were used/admitted in this consignment.</u>
<u>Representation rules</u>	<u>Use this function when the attestation confirms that risky persons, practices, or materials were excluded.</u> <u>To construct the attestation:</u> <u>Begin with the negative subject phrase (“No raw material”, “No person”).</u> <u>Use the past tense (“was used”, “were admitted”) in connection with the consignment.</u> <u>Specify the risk condition that triggered the exclusion.</u> <u>Do not use this function for conditional acceptance based on neutral criteria; use “Set conditional acceptance or rejection”.</u>
<u>Communicative function: Lift a prohibition when a condition is met</u>	
<u>Requirement example</u>	<u>The restriction on the use of recirculated water shall not apply where the competent authority has verified that its use presents no risk of contamination.</u>
<u>Requirement pattern</u>	<u><Prohibition> shall not apply where/when <condition>.</u>
<u>Attestation example</u>	<u>The recirculated water used for the production of this consignment was verified by the competent authority as presenting no risk of contamination.</u>
<u>Attestation structural template</u>	<u><Subject of the lifted prohibition> used/applied in/for this consignment was verified by <responsible agent> as <condition met>.</u>
<u>Representation rules</u>	<u>Use this function when the attestation confirms that an otherwise applicable prohibition was lifted because a specific condition was verified.</u> <u>To construct the attestation:</u> <u>Identify the subject that would otherwise be prohibited and link it to the consignment.</u> <u>State that it was verified by the responsible agent (typically the competent authority).</u> <u>Express the condition that justified lifting the prohibition.</u> <u>Do not use this function for outright permissions; use “Allow a substance or action”.</u>
<u>Communicative function: Discourage use</u>	
<u>Requirement example</u>	<u>Use of wood should be avoided unless it can be thoroughly cleaned and disinfected.</u>
<u>Requirement pattern</u>	<u>Use of <subject> should be avoided unless <condition>.</u>
<u>Attestation example</u>	<u>Where wood was used during the production of this consignment, it was thoroughly cleaned and disinfected prior to use.</u>
<u>Attestation structural template</u>	<u>Where <discouraged subject/action> was used/occurred during <production/handling> of this consignment, <controls/treatments applied prior to use>.</u>

<u>Representation rules</u>	<u>Use this function when the regulation expresses a strong recommendation against use, while leaving a conditional path open, AND that conditional path was followed in the consignment.</u> <u>To construct the attestation:</u> <u>Begin with “Where” followed by the conditional clause stating that the discouraged action occurred in the consignment.</u> <u>Describe the additional controls or treatments that justified the action (“it was thoroughly cleaned and disinfected”, “it was subjected to a validated treatment”).</u> <u>When the requirement is satisfied through non-occurrence (the discouraged item was simply not used), the attestation should be expressed under “Ban a treatment or condition”.</u> <u>Do not use this function when there is no conditional path; in that case use “Ban a treatment or condition”.</u>
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Expressing limits and targets

<u>Communicative function: Cite an official limit or condition</u>	
<u>Requirement example</u>	<u>Limits for pesticides established by the Codex Alimentarius Commission shall apply.</u>
<u>Requirement pattern</u>	<u><Limits/criteria> established by <authority> shall apply.</u>
<u>Attestation example</u>	<u>This consignment meets the limits for pesticides established by the Codex Alimentarius Commission.</u>
<u>Attestation structural template</u>	<u>This consignment meets the <limits/criteria> established by <authority>.</u>
<u>Representation rules</u>	<u>Use this function when the attestation confirms conformity with limits defined by reference to an external authority.</u> <u>To construct the attestation:</u> <u>Begin with “This consignment meets” (or an equivalent verb of conformity in the present tense).</u> <u>Identify the limits or criteria.</u> <u>Cite the issuing authority precisely (Codex Alimentarius Commission, ISO, national authority).</u> <u>Do not use this function when the limit is given explicitly; use “Set quantitative acceptance criteria”.</u>
<u>Communicative function: Set quantitative acceptance criteria</u>	
<u>Requirement example</u>	<u>A lot shall be considered acceptable when the number of defectives does not exceed the acceptance number of the sampling plan (AQL 6.5).</u>
<u>Requirement pattern</u>	<u><Subject> shall be considered acceptable when <quantitative criterion>.</u>
<u>Attestation example</u>	<u>The lot represented by this consignment was considered acceptable because the number of defectives did not exceed the acceptance number of the sampling plan (AQL 6.5).</u>
<u>Attestation structural template</u>	<u><Subject> represented by this consignment was considered acceptable because <quantitative criterion met>.</u>

<u>Representation rules</u>	<u>Use this function when the attestation confirms acceptance based on explicit quantitative criteria.</u> <u>To construct the attestation:</u> <u>Identify the subject (the lot, the batch, the sample) and link it to the consignment.</u> <u>Use the past tense (“was considered acceptable”).</u> <u>Introduce the justification with “because” and state how the quantitative criterion was satisfied.</u> <u>Cite the criterion exactly (AQL value, threshold, sampling plan).</u> <u>Do not use this function for references to external standards; use “Cite an official limit or condition”.</u>
<u>Communicative function: Require absence of an undesirable condition</u>	
<u>Requirement example</u>	<u>The product shall be free from abnormal external moisture, excluding condensation after cold storage.</u>
<u>Requirement pattern</u>	<u><Subject> shall be free from <undesirable condition>.</u>
<u>Attestation example</u>	<u>The product is free from abnormal external moisture, excluding condensation after cold storage.</u>
<u>Attestation structural template</u>	<u><Subject of this consignment> is free from <undesirable condition>, <exclusion clause if applicable>.</u>
<u>Representation rules</u>	<u>Use this function when the attestation confirms absence of a specified undesirable condition.</u> <u>To construct the attestation:</u> <u>Begin with the subject (the product, the batch).</u> <u>Use “is free from” in the present tense.</u> <u>Identify the undesirable condition precisely.</u> <u>Specify any allowed exclusion clearly.</u> <u>Do not use this function for measurable quantitative thresholds; use “Set quantitative acceptance criteria”.</u>
<u>Communicative function: Specify a minimum process performance</u>	
<u>Requirement example</u>	<u>The process shall achieve at least a 5-log reduction of Salmonella.</u>
<u>Requirement pattern</u>	<u><Process> shall achieve at least <quantitative performance>.</u>
<u>Attestation example</u>	<u>The process applied to this consignment achieved at least a 5-log reduction of Salmonella.</u>
<u>Attestation structural template</u>	<u><Process> applied to this consignment achieved at least <quantitative performance>.</u>
<u>Representation rules</u>	<u>Use this function when the attestation confirms that a minimum performance level was achieved.</u> <u>To construct the attestation:</u> <u>Identify the process and link it to the consignment (“The process applied to this consignment”).</u> <u>Use the past tense (“achieved”).</u>

	<u>State the performance metric, the target organism, substance, or parameter.</u> <u>Do not use this function for absolute absence requirements; use “Require absence of an undesirable condition”.</u>
Communicative function: <u>Require inspection, testing, or monitoring</u>	
Requirement example	<u>Products shall be inspected by a competent person before distribution.</u>
Requirement pattern	<u><Subject> shall be <inspection/testing verb> by <competent agent> <time/condition>.</u>
Attestation example	<u>Products of this consignment were inspected by a competent person prior to distribution.</u>
Attestation structural template	<u><Subject of this consignment> were/was <inspection verb in past tense> by <competent agent> <time/condition>.</u>
Representation rules	<u>Use this function when the attestation confirms that an inspection, test, or monitoring activity was performed.</u> <u>To construct the attestation:</u> <u>Begin with the subject and link it to the consignment.</u> <u>Use the past tense (“were inspected”, “were tested”, “were monitored”).</u> <u>Identify the competent agent (inspector, laboratory, authority).</u> <u>Specify when the activity occurred, where relevant.</u> <u>Do not use this function for general obligations not related to verification; use “Mandate an action or state”.</u>
Communicative function: <u>Apply a limit conditionally based on product or process characteristics</u>	
Requirement example	<u>Where the product is intended for consumption by vulnerable populations, the maximum level of <substance> shall not exceed <value>.</u>
Requirement pattern	<u>Where <characteristic>, <limit> shall apply.</u>
Attestation example	<u>The product, intended for consumption by vulnerable populations, does not contain <substance> above <value>.</u>
Attestation structural template	<u><Subject of this consignment>, <characteristic clause>, does not contain/exceed <substance/parameter> <quantitative limit>.</u>
Representation rules	<u>Use this function when the attestation reports compliance with a limit that applies only because of a specific product or process characteristic.</u> <u>To construct the attestation:</u> <u>Identify the subject and add the characteristic as a descriptive clause (“intended for vulnerable populations”, “subjected to heat treatment”).</u> <u>State the compliance in the present tense (“does not contain”, “does not exceed”).</u> <u>Cite the substance or parameter and the applicable limit.</u> <u>Do not use this function for unconditional limits; use “Cite an official limit or condition” or “Set quantitative acceptance criteria”.</u>

<u>Communicative function: Set alternative limits depending on circumstances</u>	
<u>Requirement example</u>	For products subjected to heat treatment, the maximum level of <substance> shall be <value A>; for untreated products, the limit shall be <value B>.
<u>Requirement pattern</u>	For <category A>, the limit shall be <value A>; for <category B>, the limit shall be <value B>.
<u>Attestation example</u>	This consignment, having been subjected to heat treatment, does not contain <substance> above <value A>.
<u>Attestation structural template</u>	This consignment, <clause identifying the applicable category>, does not contain/exceed <substance/parameter> <quantitative limit applicable to that category>.
<u>Representation rules</u>	Use this function when the attestation declares compliance with the specific limit that applies to the category of the consignment. To construct the attestation: Begin with “This consignment” followed by a clause that identifies its applicable category (“having been subjected to heat treatment”, “classified as untreated”). State the compliance in the present tense (“does not contain”, “does not exceed”). Cite the specific limit applicable to the category, not the full set of alternatives. Do not use this function for single conditional limits; use “Apply a limit conditionally based on product or process characteristics”.

ANNEX 3

Tables to support vocabulary standardization

A Ontology's controlled lists of subjects or objects

This list provides standardized terms for the subjects or objects (e.g. "Product," "Institution," "Facility") and objects (e.g. "Temperature").

Subjects or objects	
Group	Value
Core analytical and biological entities	ANALYSIS
	CASE
	DISEASE
	MICROORGANISM
	VIRUS
	CHEMICAL CONTAMINANTS/HAZARDS
	PHYSICAL HAZARDS
	pH
	PROTEIN
Materials, products and substances	BATCH
	MATERIAL
	RAW MATERIAL
	SUBSTANCE
	INGREDIENT
	PRODUCT
Processes, treatments and operations	PROCESS
	PROCEDURE
	TREATMENT
	PREVENTION
	CONDITION
	CONTAMINATION
	EMISSION
Testing, verification and certification	CERTIFICATION
	INSPECTION
	TESTING
	VERIFICATION
	ANALYSIS
	INDICATOR
	METRIC
Facilities, equipment and packaging	FACILITY
	EQUIPMENT
	PACKAGE
	SEAL

Institutions, persons and roles	INSTITUTION / ORGANIZATION
	PERSON / PROFESSIONAL
	FACILITY
	EMPLOYEE
Administrative, regulatory and documentary	DOCUMENTATION
	INSTRUCTION
	PLAN
	POLICY
	PROGRAM
	REGULATION
	RESTRICTION
Spatial and temporal entities	LOCATION
	TERRITORY
	TIME
Commercial and logistic entities	COMMERCE
	TRADE
	TRANSPORT
	HOLDING
Auxiliary entities	LANGUAGE
	LABEL

B Ontology's controlled lists of predicates

This list ensures consistency to express relationships (predicates) in triples. Predicates are formulated in the register of attestation – expressing states, results, or completed actions – consistent with the function of a sanitary attestation as a statement that a requirement has been met for the consignment covered by the certificate.

Predicates	Description	Example
accreditedBy	accreditedBy is used to specify the authority or organization that has officially recognized or accredited a test, verification, or laboratory for meeting certain standards or requirements.	VERIFICATION #type(Test) accreditedBy INSTITUTION/ORGANIZATION #recognition(CompetentAuthority) #territory(Country) #role(Exporting)
achieves	achieves indicates that the subject (often a process or treatment) results in or produces the outcome or effect specified by the object.	PROCESS #type(Sterilization) achieves METRIC #value(SpecifiedF0)
applies	applies indicates that a subject (often a process or procedure) enacts or implements a specific measure, prevention, or treatment to achieve a particular goal (e.g., safety, contamination prevention).	PROCESS #type(Packaging) applies PREVENTION #type(ContaminationOfProducts)
approvedBy	approvedBy is used to state that a subject (often an establishment, product, or plan) has been officially approved or authorized by a specific authority or organization.	PRODUCT approvedBy INSTITUTION/ORGANIZATION #type(CompetentAuthority)
approvedFor	approvedFor is used to state that a subject (often a product, establishment, or country) has been officially approved for a particular use, market, or recipient, such as human consumption, export, or acceptance by an official agency.	PRODUCT approvedFor CONDITION #type(HumanConsumption)
authorizedBy	authorizedBy links an entity (e.g., a country, holding, or establishment) to the authority (often an international organization or regulatory body) that has granted it official authorization or recognition.	TERRITORY #type(Country) #country(ISO-CODE) authorizedBy INSTITUTION/ORGANIZATION #recognition(InternationalOrganizations)
authorizedFor	authorizedFor is used to state that an entity is officially permitted or recognized to engage in a particular activity, such as export, import, or trade, often by a competent authority.	INSTITUTION/ORGANIZATION #type(Holding) authorizedFor PROCESS #type(Production) #product(RawMilk)
carriedIn	carriedIn indicates that a product or item is physically placed or transported inside a specified container or case.	PRODUCT #type(Dairy) carriedIn CASE #type(cases)
certifiedFor	certifiedFor is used to state that the subject (such as a batch) has been officially certified for a particular certification or purpose, such as quality analysis or health status.	BATCH certifiedFor CERTIFICATION #type(QualityAnalysis)
comesFrom	comesFrom indicates the source or origin of a subject, typically linking products, materials, to their place of origin, establishment, herd, country, or health status.	PRODUCT comesFrom FACILITY #type(Establishment) #authorization(Export)

completedIn	completedIn specifies the area or place in which a process or procedure has been completed.	PROCESS completedIn TERRITORY #type(Area) #additional(Designated)
compliesWith	compliesWith indicates that the subject meets or fulfils the requirements, standards, or regulations specified by the object.	TRANSPORT #type(distribution) compliesWith REGULATION #specification(SanitaryRegulations)
conductedBy	conductedBy specifies which entity (e.g., authority, service) is responsible for performing or overseeing a process or verification.	VERIFICATION conductedBy INSTITUTION/ORGANIZATION #type(CompetentAuthority)
confirmedFor	confirmedFor is used to assert that a country or territory has been confirmed to have a particular disease, based on official recognition or reporting.	TERRITORY #type(Country) #country(ISO-CODE) confirmedFor DISEASE #type(DiseaseName)
describedIn	describedIn indicates that the subject is formally defined, explained, or specified within the referenced document or standard.	PROCESS #type(Measure) #specification(EquivalentToPasteurization) describedIn DOCUMENTATION #recognition(CodexAlimentarius)
exceeds	exceeds indicates that the subject is greater than the object in some measurable way, such as time, temperature, or quantity.	PROCESS exceeds TIME #time(120) #timeUnit(Seconds)
executedBy	executedBy links a verification process to the entity (often an official veterinary service) responsible for executing it.	VERIFICATION #type(Systematic) executedBy INSTITUTION/ORGANIZATION #type(OfficialVeterinaryService)
exportedIn	exportedIn is used to specify the type or condition of the container or packaging used for exporting a product, ensuring compliance with sanitary or material requirements.	PRODUCT #type(Dairy) exportedIn CASE #type(Container) #condition(FirstUse)
fitFor	fitFor specifies that the subject meets the requirements or standards necessary for the object (typically a use, condition, or recipient).	PRODUCT fitFor CONDITION #type(HumanConsumption)
freeFrom	freeFrom indicates that the subject is absent of, or not contaminated/affected by, the specified object (e.g., disease, contaminant, or substance).	PRODUCT freeFrom DISEASE #type(diseaseNames)
has	has indicates that the subject possesses, contains, or is characterized by the object. Used for expressing ownership, attributes, or associated features.	TRANSPORT #type(Vehicle) has EQUIPMENT #type(ColdGeneration) #condition(Appropriate)
identifiedWith	identifiedWith is used to assert that a subject has been associated with a specific identifier (such as an official seal or tag), typically for regulatory, health, or traceability purposes.	PRODUCT identifiedWith SEAL #type(Official) #issuer(SIF)
importedFrom	importedFrom specifies the source country or territory from which a product has been imported.	PRODUCT #type(HeatTreatedMilkAndMilk) importedFrom TERRITORY #type(Country) #country(ISO-CODE) #role(Third)

includes	includes expresses that the subject is a collection, set, or composite entity that has the object as one of its elements or constituents.	MICROORGANISM #type(Pathogenic) includes MICROORGANISM #type(ClostridiumPerfringens)
indicates	indicates expresses that the subject (often a document, certificate, or label) denotes or provides information about the object (such as a process, date, or duration).	CERTIFICATION #type(ZoosanitaryCertificate) indicates PROCESS #phase(Production) #timeMin(60) #timeUnit(Days)
inspectedBy	inspectedBy specifies which authority or entity performed an inspection on the subject (e.g., a facility or raw material).	FACILITY #type(All) inspectedBy INSTITUTION/ORGANIZATION #recognition(CompetentAuthority)
inspectedIn	inspectedIn specifies the designated area or place where an item has been officially inspected.	PRODUCT inspectedIn TERRITORY #type(DesignatedArea)
labeledWith	labeledWith indicates that the subject (typically a product or container) bears a label that provides the object (such as country of origin, approval number, ingredient list, or other identifying information).	PRODUCT #type(Livestock) labeledWith LABEL #information(ProductName)
locatedIn	locatedIn indicates that the subject (typically an area or entity) is geographically or administratively contained within the object (usually a larger area, such as a country or region).	TERRITORY #type(Area) locatedIn TERRITORY #type(Country) #country(ISO-CODE) #role(Exporting)
madeFrom	madeFrom indicates the raw material or ingredient used in the production or composition of a product.	PRODUCT #type(Cheese) madeFrom RAWMATERIAL #type(UnpasteurizedMilk)
madeOf	madeOf indicates the material, ingredient, or substance from which an item is composed or constructed.	PRODUCT madeOf MATERIAL #condition(Clean)
mixedWith	mixedWith is used to state if a product (such as a dairy product) has been combined with another substance (such as raw milk), or to assert that such mixing has not occurred, often for regulatory or health compliance reasons.	PRODUCT #type(Dairy) mixedWith RAWMATERIAL #type(RawMilk) #applied(False)
monitoredFor	monitoredFor indicates that the subject is systematically observed or checked for the presence, level, or status of the object (such as a parameter, substance, or disease).	TERRITORY #type(Country) #country(ISO-CODE) monitoredFor DISEASE #type(DiseaseName) #applied(False)
obtainedIn	obtainedIn specifies the setting, restriction, or program under which a product or material was obtained.	PRODUCT obtainedIn RESTRICTION #type(Sanitary)
occursAt	occursAt indicates the place, time, or context where a process, event, or verification happens.	PROCEDURE #type(IdentityCheck) occursAt LOCATION #type(PlaceOfLoading)
packagedIn	packagedIn is used to specify the type or condition of the packaging or container that holds a product, especially in the context of food safety, export, or regulatory compliance.	PRODUCT packagedIn TERRITORY #type(Country) #role(Exporting)

packedWith	packedWith specifies the materials or container types used for packaging a product, often to ensure compliance with hygiene, safety, or regulatory requirements.	PRODUCT packedWith MATERIAL #condition(CleanAndHarmlessMaterials)
partOf	partOf is used to assert that one entity (the subject) is a constituent, member, or segment of a larger entity (the object).	SUBSTANCE #type(MedicinesAndChemicals) partOf PREVENTION #type(VeterinaryPractices)
preparedIn	preparedIn specifies the area, facility, or environment in which a product or item is prepared, often to ensure compliance with hygiene or safety standards.	PRODUCT preparedIn TERRITORY #type(Area) #condition(Sanitized)
processedIn	processedIn links a product to the specific establishment, program, or set of conditions under which it was processed, often to assert compliance with safety, hygiene, or regulatory controls.	PRODUCT #type(Milk) processedIn FACILITY #type(Establishment) #recognition(CompetentAuthority)
producedIn	producedIn specifies the place (such as a country, establishment, or processing plant) where a product was produced.	PRODUCT #type(Dairy) producedIn FACILITY #type(DairyProcessingPlant)
producedUnder	producedUnder Links a product to the set of conditions or requirements (such as sanitary, regulatory, or quality standards) that governed its production process.	PRODUCT producedUnder CONDITION #type(Sanitary)
prohibitedBy	prohibitedBy attests that the subject is not permitted under the authority or regulation specified by the object, typically used to reference the regulatory basis that supports an absence or non-application statement about the consignment.	TREATMENT #type(IonizingIrradiation) prohibitedBy INSTITUTION/ORGANIZATION #type(CompetentAuthority) #territory(Country) #role(Importing)
prohibitedIn	prohibitedIn attests that the subject (a substance, practice, or procedure) is not permitted in the specified territory, typically used to characterize the regulatory context of the country relevant to the consignment (e.g. producing, exporting, or importing country).	SUBSTANCE #type(Antibiotic) #name(Chloramphenicol) prohibitedIn TERRITORY #type(Country) #country(ISO-CODE) #role(Producing)
providedBy	providedBy indicates the source or supplier of a resource, service, or document; typically links a product, certification, or information item to the entity responsible for its provision.	CERTIFICATION providedBy PERSON/PROFESSIONAL #type(Veterinarian) #recognition(Licensed)
providedIn	providedIn specifies the language or medium in which something (such as instructions or documentation) is given.	INSTRUCTION #type(WarningAndSafety) providedIn LANGUAGE #type(National)
registeredWith	registeredWith is used to state that a subject (typically a product, establishment, or entity) is officially registered or recorded with a particular organization or authority.	PRODUCT registeredWith INSTITUTION/ORGANIZATION #type(DIPOA)
reported	reported indicates the official notification or documentation of the presence or absence of a disease or condition in a territory, often with a time qualifier and sometimes compliance context.	TERRITORY reported DISEASE #type(diseaseName) #time(6) #timeUnit(Months) #applied(False)

shows	shows indicates that the subject (often a certificate, test, or product) demonstrates or provides evidence of a specific result or property in the object.	TEST shows DISEASE #type(diseaseName) #phase(Milking)
storedIn	storedIn is used to specify the place, area, or conditions in which a product, item, or material is kept during storage.	PRODUCT storedIn TERRITORY #type(DesignatedArea)
subjectedTo	subjectedTo is used to state that a subject (such as a dairy product, raw material), has been exposed to, or has undergone, a particular process, treatment, or verification (e.g., heat treatment, pasteurization, inspection).	PRODUCT subjectedTo TREATMENT #type(UHT) #temp(135) #tempUnit(Celsius) #additional(with suitable holding time)
supervisedBy	supervisedBy is used to state that a subject (such as a product or establishment) is under the official supervision or control of a designated authority, usually for regulatory, safety, or quality assurance purposes.	PRODUCT supervisedBy INSTITUTION/ORGANIZATION #role(CompetentAuthority)
testedBy	testedBy specifies which organization or authority is responsible for testing a given raw material or product.	RAWMATERIAL testedBy INSTITUTION/ORGANIZATION #type(GovernmentsVeterinaryAuthority)
testedAt	testedAt links a subject (such as a product or raw material) to the laboratory or facility where it underwent testing. It specifies the place of analysis, often in the context of regulatory or quality assurance processes.	PRODUCT #type(milk) testedAt LABORATORY #status(approved)
testedFor	testedFor is used to link a subject (typically a food product or raw material) to the specific substance, microorganism, or process for which it has been tested. It expresses the target or purpose of the testing procedure.	RAWMATERIAL #type(RawMilkCheese) testedFor DISEASE #type(ListeriaMonocytogenes) #phase(AfterRipened)
transmittableThrough	transmittableThrough is used to specify the medium (such as a product or substance) by which a disease can be transmitted, according to regulatory or scientific sources.	DISEASE transmittableThrough PRODUCT #type(Milk) #recognition(ECLegislation)
transportedIn	transportedIn links a product to the entity (such as a country, vehicle, or container) that serves as the medium or location for its transportation.	PRODUCT transportedIn TERRITORY #type(Country) #country(ISO-CODE) #role(Exporting) #recognition(CompetentAuthority)
treatedFor	treatedFor indicates that the subject has been subjected to a treatment process targeting a specific agent (such as a virus or pathogen) for inactivation or removal.	PRODUCT treatedFor VIRUS #type(virusName)
under	under indicates that the subject is subject to the authority, supervision, or control of the object (often an official body, program, or regulatory framework).	FACILITY #type(Establishment) under PROGRAM #type(TuberculosisControlPlan)
verifiedBy	verifiedBy links an entity (often a product or process) to the authority or organization that has verified its compliance, quality, or status.	PRODUCT verifiedBy INSTITUTION/ORGANIZATION #recognition(CompetentAuthority)

verifiedFor	verifiedFor is used to assert that an item has undergone verification or validation with respect to a particular regulation, standard, or requirement, often in the context of sanitary or safety compliance.	PRODUCT verifiedFor REGULATION #type(Sanitary) #significance(Relevant)
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C Ontology's controlled lists of metadata attributes

Metadata attributes help specify further details related to the subject, predicate, and object. These attributes could include things like the unit of measurement (e.g., #unit(Celsius)).

Family: Identity And Classification		
Attribute	Description	Example
#type	#type is a metadata attribute that assigns a class, category, or type to a resource, such as 'Country', 'Milk', 'Establishment', etc. It is typically used to provide semantic context to the subject or object in triples, supporting classification and reasoning.	TERRITORY #type(Country) #country(ISO-CODE) #role(Exporting) equivalentTo REGULATION #condition(Sanitary)
#role	#role is a metadata attribute that designates the specific function or status of an entity (such as Exporting, Importing, CompetentAuthority, DairyManufacturer, etc.) in the context of a triple, providing additional semantic clarity about how the entity participates in the described relationship.	TERRITORY #type(Country) #country(ISO-CODE) #role(Exporting) compliesWith REGULATION #specification(RelevantSanitaryRegulations)
#agent	#agent identifies the actor or responsible entity in a process or action, such as who applies a treatment, conducts a verification, or approves a product.	VERIFICATION conductedBy INSTITUTION/ORGANIZATION #type(CompetentAuthority) #agent(OfficialVeterinaryService))
#material	#material specifies the physical substance(s) that constitute an item, commonly used to indicate the composition of packaging, containers, or products in food safety and supply chain contexts.	PRODUCT #type(Milk) exportedIn CASE #type(Container) #condition(FirstUse) #material(NonContaminating)
#biologicalHazard	#biologicalHazard is used to specify the particular biological agent – such as a pathogenic bacterium, virus, parasite, or fungus – that is the focus of a safety requirement, test, treatment, or prohibition. It is typically used as a qualifier to MICROORGANISM or DISEASE objects to identify the specific organism concerned	PRODUCT freeFrom MICROORGANISM #type(Pathogenic) #biologicalHazard(ListeriaMonocytogenes)
#chemicalHazard	#chemicalHazard is used to specify the particular chemical agent – such as a toxin, pesticide residue, additive, or contaminant – that is the focus of a safety requirement, test, or prohibition. It is typically used as a qualifier to SUBSTANCE or CONTAMINATION objects to identify the specific chemical agent concerned.	PRODUCT freeFrom CONTAMINATION #type(Chemical) #chemicalHazard(AflatoxinB1)

#physicalHazard	#physicalHazard is used to specify the particular physical agent – such as glass, metal, bone fragments, or foreign bodies – that is the focus of a safety requirement or prohibition. It is typically used as a qualifier to CONTAMINATION objects to identify the specific physical agent concerned.	PRODUCT freeFrom CONTAMINATION #type(Physical) #physicalHazard(MetalFragment)
Family: Spatial / Jurisdictional		
Attribute	Description	Example
#territory	#territory is used to specify the geographic scope or jurisdiction for regulations, disease status (e.g., disease-free), trade authorizations, or origin of products. It is a key attribute for contextualizing compliance, health status, and eligibility for export/import.	PRODUCT monitoredFor DISEASE #type(DiseaseName) #time(6) #timeUnit(Months) #location(Farm) #applied(False)
#country	#country denotes the country (often as an ISO code) relevant to the subject, such as the origin, destination, or regulatory jurisdiction for products, establishments, or processes.	TERRITORY #type(Country) #country(ISO-CODE) #role(Exporting) compliesWith REGULATION #specification(RelevantSanitaryRegulations)
#location	#location is used to specify the geographical or spatial context relevant to the subject, such as the country, region, establishment, or designated area where an activity occurs or an entity is situated.	PRODUCT authorizedFor COMMERCE #activity(Trade) #location(Country) #role(Exporting)
#origin	#origin denotes the original source or provenance of an entity, country, or establishment from which a raw material or product is derived. It is used to trace the origin for regulatory, safety, or quality purposes.	RAWMATERIAL #origin(Factory) comesFrom TERRITORY #type(Country) #role(Origin)
#destination	#destination indicates the final target, recipient, or endpoint for a product, process, or authorization. It is commonly used to specify where goods are exported, to whom permissions are granted, or the intended market or use of a product.	FACILITY #type(ExportEstablishment) authorizedFor COMMERCE #type(Export) #destination(Generalized)
Family: Temporal		
Attribute	Description	Example
#time	#time is a metadata attribute that denotes a specific duration or point in time relevant to the subject and predicate of a triple. It is commonly used to express how long a process (e.g., heat treatment, maturation, storage) is applied, or to set minimum/maximum time requirements for regulatory or quality purposes.	PRODUCT subjectedTo TREATMENT #type(HTST) #temp(72) #tempUnit(Celsius) #time(15) #timeUnit(seconds)

#timeMin	#timeMin specifies the minimum time threshold that must be met or exceeded for a process, treatment, or condition to be considered valid or compliant, often used in regulatory, safety, or quality contexts.	TERRITORY #type(Farm) freeFrom DISEASE #type(diseaseName) #timeMin(12) #timeUnit(Months)
#timeMax	#timeMax is a metadata attribute used to specify the upper limit of time allowed or required for a process, treatment, or condition in food safety, processing, or regulatory contexts.	PRODUCT subjectedTo TREATMENT #type(Heat) #timeMin(15) #timeMax(20) #timeUnit(seconds)
#timeSpan	#timeSpan denotes the length of time associated with a process, condition, or requirement, typically expressed in units such as days, months, or years. It is used to qualify statements about disease freedom, maturation, quarantine, or other temporal requirements.	PRODUCT freeFrom DISEASE #type(diseaseName) #timeSpan(12) #timeUnit(Months)
#timeUnit	#timeUnit indicates the unit of measurement for time-related attributes in processes, treatments, or conditions, ensuring clarity and standardization of temporal data.	PRODUCT subjectedTo TREATMENT #type(HTST) #temp(72) #tempUnit(Celsius) #time(15) #timeUnit(seconds)
#timeRule	#timeRule indicates the logical rule or comparison operator used to interpret a time value in the context of a process, restriction, or requirement (e.g., 'less than 60 days').	FACILITY #type(Establishment) #role(PrimaryProduction) compliesWith PREVENTION #type(Quarantine) #timespan(60) #timeUnit(days) #timeRule(lessThan) #phase(Dispatch) #applied(False)
#phase	#phase is used to annotate a triple with the particular stage of a process (e.g., production, packaging, pasteurization, collection, manufacturing, etc.) during which an action, treatment, or regulatory compliance occurs. It provides contextual granularity to process-oriented data.	PRODUCT compliesWith REGULATION #specification(HygieneRegulations) #phase(Collection)

Family: Quantitative / Technical

Attribute	Description	Example
#temp	#temp indicates the temperature value (typically in degrees Celsius) relevant to a process or treatment, such as pasteurization, sterilization, or storage, ensuring compliance with safety and quality standards.	PRODUCT subjectedTo TREATMENT #type(HTST) #temp(72) #tempUnit(Celsius) #time(15) #timeUnit(seconds)
#tempMin	#tempMin specifies the lowest temperature (with unit, e.g., Celsius) that must be achieved or maintained during a process such as pasteurization, sterilization, or cheese maturation to ensure safety or compliance.	PRODUCT #type(Dairy) subjectedTo TREATMENT #tempMin(132) #tempUnit(Celsius) #timeMin(1) #timeUnit(seconds)
#tempMax	The #tempMax attribute specifies the upper temperature limit applied during a process, such as heat treatment, pasteurization, or storage, ensuring compliance with safety or quality standards.	PRODUCT subjectedTo TREATMENT #type(Heat) #tempMin(72) #tempMax(75) #tempUnit(Celsius)

#tempUnit	#tempUnit indicates the unit (such as Celsius, Fahrenheit, or Minutes) for a temperature value in a process or treatment, ensuring clarity and standardization in temperature-related data.	PRODUCT subjectedTo TREATMENT #type(HTST) #temp(72) #tempUnit(Celsius) #time(15) #timeUnit(seconds)
#pH	The #pH attribute represents the hydrogen ion concentration of a product, ingredient, or process environment, especially relevant in food safety and dairy processing to determine compliance with specific treatment or storage requirements.	PRODUCT subjectedTo TREATMENT #type(HTST) #pH(7OrLower)
#value	#value denotes a specific value, measurement, or parameter relevant to the subject, such as a required temperature, time, pH, or other metric in regulatory or process contexts.	PROCESS #type(Sterilisation) achieves METRIC #value(SpecifiedF0)
#levels	#levels refers to quantitative thresholds or limits, typically set by regulations, for substances such as contaminants, residues, or additives in products. These levels are used to ensure food safety and compliance with health standards.	PRODUCT #type(Milk) freeFrom CONTAMINATION #type(Additives) #levels(HazardousToHuman)
#max	#max specifies the upper limit or maximum permissible value for a property, often used in regulatory or safety contexts (e.g., maximum residue levels in food products).	SUBSTANCE #type(Residues) #max(value) compliesWith REGULATION #specification(RelevantSanitaryRegulations)
#size	#size is used to indicate the minimum or specific spatial extent required or present for an entity, such as a geographic area, facility, or production site. It is often expressed with a value and a unit (e.g., kilometres, square meters).	TERRITORY #type(Area) #size(AtLeast10Km) #role(PrimaryProductionEstablishment) compliesWith PREVENTION #timespan(InPrior60Days) #phase(Dispatch) #applied(False)
Family: Regulatory / Compliance		
Attribute	Description	Example
#authorization	#authorization is a metadata attribute indicating that a subject (e.g., establishment, product, country) has been officially permitted or approved by a recognized authority to carry out a defined activity, such as export, import, production, or compliance with standards.	PRODUCT comesFrom FACILITY #type(Establishment) #authorization(Export)
#compliance	#compliance is used to indicate whether a subject (e.g., product, process, establishment) meets or follows relevant legal, sanitary, or quality standards, such as hygiene regulations, residue limits, disease-free status, or official approvals. It is central in regulatory and certification contexts, especially for international trade and food safety.	PROCESS #type(Treatment) applies PREVENTION #type(AvoidContactOfMilkProductsWithMicroOrganismsThatCauseNotifiableInfectiousDiseases) #phase(AfterTreatment) #compliance(OIEList)

#recognition	#recognition is used to indicate that an entity (e.g., a product, establishment, regulation, or process) has been officially acknowledged as meeting certain standards, requirements, or equivalence by a competent authority, international organization, or standard-setting body.	VERIFICATION #type(Test) accreditedBy INSTITUTION/ORGANIZATION #recognition(CompetentAuthority) #territory(Country) #role(Exporting)
#regulation	#regulation is used to indicate the regulatory framework, standard, or legal requirement that applies to or is complied with by the subject. It often appears in triples where the subject is a product, process, establishment, or territory, and the object is a specific regulation, standard, or requirement.	PRODUCT freeFrom DISEASE #type(InfectiousContagiousDiseases) #regulation(EULegislation)
#specification	#specification identifies the particular standard, criterion, or technical detail that a regulation, process, or product must comply with or reference. It is commonly used to link a regulation or process to its detailed requirements, such as hygiene conditions, maximum residue limits, or other explicit standards.	PRODUCT compliesWith REGULATION #specification(HygieneRegulations)
#status	#status is used to denote the official standing or recognition of an entity, such as whether a laboratory is approved, a product is certified, or a process is compliant with standards. It typically captures binary or enumerated values reflecting regulatory or administrative decisions.	PRODUCT #type(milk) testedAt LABORATORY #status(approved)
#significance	#significance is a metadata qualifier that marks a regulation, criterion, or result as being of particular importance or relevance, often used to highlight the regulatory or compliance weight of a statement or test result.	PRODUCT verifiedFor REGULATION #type(Sanitary) #significance(Relevant)
#scope	#scope is used to qualify the applicability of a regulation, standard, or requirement, indicating its domain, such as local, national, or international, or its operational context (e.g., manufacturing, packaging). It provides additional context for the interpretation of the main statement.	PROCESS #type(Manufacturing) compliesWith REGULATION #specification(LocalLegislation) #scope(Local) #phase(Manufacturing)
#purpose	#purpose indicates the underlying reason or objective for a regulation, process, or requirement, providing semantic context for why it is enforced or necessary.	PRODUCT compliesWith REGULATION #purpose(Guarantees)
Family: Contextual Qualifier		
Attribute	Description	Example
#condition	#condition is a metadata attribute used to annotate triples with additional contextual, qualifying, or constraining information about the state, requirement, or circumstance relevant to the subject or object. It is often used to clarify under what conditions a regulation, process, or status is valid or applicable.	TERRITORY #type(Country) #country(ISO-CODE) #role(Exporting) equivalentTo REGULATION #condition(Sanitary)

#context	#context is a metadata attribute that attaches contextual qualifiers to a triple, such as regulatory regime, temporal scope, jurisdiction, or special conditions, thereby refining the interpretation or applicability of the statement.	PRODUCT freeFrom DISEASE #type(diseaseName) #time(36) #timeUnit(Months) #context(contextDetail)
#additional	#additional is a metadata used to attach extra, non-core information to a subject-predicate-object statement, typically enhancing the main assertion with further specifics.	PRODUCT subjectedTo TREATMENT #type(UHT) #temp(135) #tempUnit(Celsius) #additional(with suitable holding time)
#applied	#applied specifies that a certain rule, standard, or preventive measure is relevant to or enforced upon a given subject, such as a product, process, or area. It is used to link the subject to the applicable regulation, procedure, or preventive action.	PRODUCT monitoredFor DISEASE #type(DiseaseName) #time(6) #timeUnit(Months) #territory(Farm) #applied(False)

Family: Operational Process

Attribute	Description	Example
#activity	#activity indicates the specific commercial or regulatory action (e.g., marketing, sales, trade, export, import) that a product, establishment, or country is authorized or involved in. It is typically used as a qualifier to clarify the nature of authorization or approval.	PRODUCT authorizedFor COMMERCE #activity(Marketing) #location(Country)
#practice	#practice is used to indicate the specific operational standards, protocols, or best practices that an entity (such as an establishment or process) adheres to, implements, or is required to follow. It often appears in the context of compliance with hygiene, safety, or quality management systems.	PRODUCT comesFrom FACILITY #type(Establishment) #practice(GMP)
#target	#target is used to indicate the entity (e.g. product, human consumption) that is the focus or recipient of a process, treatment, regulation, or preventive action in a semantic triple.	PLAN #type(ResidueMonitoring) #target(rawMaterial) compliesWith REGULATION #specification(RelevantSanitary)
#occurrence	#occurrence is used to denote how many times a specific event, such as a treatment or process, is performed on the subject. It typically appears as a property of a treatment or process, with the object being an integer or a value indicating frequency.	PRODUCT subjectedTo TREATMENT #type(HTST) #occurrence(2)

Family: Sanitary Risk

Attribute	Description	Example
#disease	#disease indicates a disease entity or status associated with a subject (such as a product, territory, or establishment). It is used to express whether a subject is free from, affected by, or related to a specific disease, often for regulatory, certification, or traceability purposes.	PRODUCT subjectedTo TREATMENT #type(UHT) #disease(diseaseName)

#signs	#signs is used in metadata to specify the presence or absence of particular observable characteristics, often clinical signs, in products. It helps to document compliance with health requirements or to indicate disease status.	PRODUCT freeFrom DISEASE #type(DiseaseName) #signs(Clinical)
#guarantee	#guarantee captures structured information about the assurances or controls in place to ensure compliance with relevant standards (e.g., sanitary, hygienic, regulatory) for products, processes, establishments, or territories. It documents the presence of preventive measures, regulatory compliance, certifications, and the absence of hazards or contaminants.	PRODUCT #type(Milk) subjectedTo TREATMENT #type(Heat) #guarantee(DestructionOfPathogenicA gents)
Family: Outcome / Equivalence		
Attribute	Description	Example
#effect	#effect denotes the result or consequence that arises from a specified process, treatment, or action. It is commonly used to link a process or treatment to its intended or achieved outcome, such as inactivation of pathogens, compliance with standards, or equivalence to a regulatory requirement.	PRODUCT #type(RawMilk) subjectedTo TREATMENT #effect(Equivalent)
#result	#result specifies the outcome or value obtained from a process, test, or measurement, often used in conjunction with testing or analysis predicates to record the observed or measured result.	PRODUCT #type(milk) subjectedTo TESTING #type(AlkalinePhosphatase) #result(Negative)
#equivalent	#equivalent denotes equivalence between two entities, typically in the context of regulatory, sanitary, or technical standards. It is used to assert that one process, treatment, or regulation achieves the same outcome or meets the same requirements as another recognized standard.	PRODUCT subjectedTo TREATMENT #equivalent(HTST)
Family: Documentation Traceability		
Attribute	Description	Example
#information	#information denotes the specific informational content or type present in a label, documentation, or data record, such as product names, dates, or other identifying details.	PRODUCT #type(Milk) has LABEL #information(ProductName)
#issuer	#issuer identifies the authoritative body or individual responsible for granting official approval, certification, or documentation, often used in contexts like seals, certificates, or regulatory compliance.	PRODUCT identifiedWith SEAL #type(Official) #issuer(SIF)

Family: Trade Status		
Attribute	Description	Example
#foreign	#foreign is a boolean or flag attribute that marks an establishment, organization, or other entity as being foreign (not domestic), often in the context of authorization, approval, or origin for trade, export, or regulatory compliance.	FACILITY #type(Establishment) #foreign(True) authorizedFor TRADE #type(Export) #territory(Country)