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Item 4 of the provisional agenda
Revision of the Standard for Seed Potatoes

Preliminary proposals for revisions to the Standard for Seed Potatoes

Submitted by the rapporteur's group

Summary

At its 2022 session, the Specialized Section decided to undertake a full review of the United Nations Economic Commission for Europe (UNECE) Standard S-1 concerning the marketing and commercial quality control of seed potatoes. During 2022, the rapporteur's group (consisting of Finland (rapporteur), France, Germany, the Netherlands (Kingdom of the), Spain, the United Kingdom of Great Britain and Northern Ireland, the United States of America, Australian Seed Potato Industry Certification Authority, Euroseeds, and Potato Certification Service (South Africa)) met in four half-day online meetings, with its initial proposed changes tabled for discussion at the 2023 meeting of the Specialized Section.

Over the course of 2023, the rapporteur's group has continued its work to review the Standard and has met in three half-day online meetings, facilitated by the secretariat, the last of which was held on 13 December 2023. The proposed revisions were also discussed at the rapporteur's meeting in Brest, France, in October 2023.

This document contains the proposed revisions to the UNECE Standard for Seed Potatoes as per the status of discussions in the rapporteur's group on 13 December 2023. Text that is under discussion is shown in square brackets and underlined. To facilitate the review, document ECE/CTCS/WP.7/GE.6/2024/INF.2 provides a comparison of this proposed revised text with the existing (2021) version of the Standard.

The Specialized Section is invited to review the proposed changes and provide additional suggestions to the rapporteur's group.

Introduction

I. Goals and scope of the United Nations Economic Commission for Europe Standard for seed potatoes

The goal of the Standard is to act as a world reference intended to facilitate fair trade of seed potatoes by:

- defining harmonized quality requirements
- creating a harmonized commercial quality certification system
- promoting the adoption of the Standard into national or regional seed schemes
- developing and facilitating capacity-building for seed potatoes.

To reach this goal the Standard covers the following requirements by certification:

- Varietal identity and varietal purity
- Genealogy and traceability
- Pests, diseases and defects affecting commercial quality or yield
- External quality and physiology
- Sizing
- Labelling.

As a consequence, the Standard considers issues falling under the World Trade Organization Technical Barriers to Trade (WTO-TBT) Agreement.

[To add a definition of pest, in annex of definitions, e.g. ISPM 5 – Pest – any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products (FAO, 1990; revised FAO, 1995; IPPC, 1997).]

II. Application of the Standard

The UNECE Standard is intended for application on export and import of seed potatoes. This means for

Export: All seed potatoes certified and labelled for export by the Certifying Authority (CA) meet at least the requirements of the Standard.

Import: Seed potatoes certified and labelled according to the UNECE Standard are accepted as meeting national standards or technical regulations for seed potato quality. Where a country establishes more stringent quality requirements, these should be technically justified and the same requirements should be applied to domestic production.

The CA is responsible for ensuring that the provisions and conditions as specified in the Standard are applied. The CA is not responsible for the quality of the seed lot. The responsibility for the quality of the lot remains with the seed owner. [Include definition of seed owner in annex of definitions.]

The application of the Standard is without prejudice to any other legislation concerning plant health and the health of persons and animals, industrial or commercial property, including intellectual property rights. [To check with legal services.]

The UNECE secretariat will maintain a list of certifying authorities of seed potatoes.

III. Seed potato certification

Seed potato certification is an official quality control procedure concerning the commercial quality, traceability and marketing of seed potatoes. The process of certification includes various critical control points which are summarized in the table below. Additional minimum requirements to achieve the certification of crops and tubers are listed throughout the Standard. The definition of terms applicable to the Standard are listed in annex VII.

Summary of critical control points of seed potato certification [Table to revised]

Critical control point	*Description*	*Relevant sections of the Standard*	*Supporting reference*
Initial stock*	Seed potatoes to be certified using initial stock must be originally derived from pathogen-free microplants that have a known variety identity.	Annex I: Minimum conditions to be satisfied in the production of Pre-basic Tissue Culture (TC) seed potatoes	Guide on minituber production (under development)
Field inspection	All seed potato crops to be certified under the Standard must be inspected during the growth of the crop.	Annex II: Minimum conditions to be satisfied by the crop; field inspection procedures	Guide to Seed Potato Field Inspection: Recommended Practices (ECE//TRADE/421) Guide to Seed Potato Diseases, Pests and Defects (ECE/TRADE/416)
Tuber inspection	All seed potato lots to be certified under the Standard must be inspected before marketing.	Annex III: Minimum quality conditions for lots of seed potatoes	Guide to Seed Potato Lot Inspection: Recommended Practices (ECE/TRADE/435) Guide to Seed Potato Diseases, Pests and Defects (ECE/TRADE/416) Annex VIII: Assessment key for percentage tuber surface area coverage of blemish diseases [to consider moving out of standard into a separate supporting document]
Direct progeny/post-harvest evaluation procedures	The incidence of the virus and/or other pathogens in the direct progeny may be determined by inspection and/or testing of tubers or plants derived from a sample of tubers from the crop, i.e. post-harvest evaluation.	Annex IV: Minimum conditions to be satisfied by direct progeny of seed potatoes; post-harvest evaluation procedures	Guide to Seed Potato Diseases, Pests and Defects (ECE/TRADE/416)
Closing or sealing	Containers of seed potatoes shall be closed	Section VI B Closing of containers	Guide on Operating a Seed Potato Certification

Critical control point	*Description*	*Relevant sections of the Standard*	*Supporting reference*
	officially or under official control.		Service (ECE/TRADE/434) Guide to Seed Potato Lot Inspection: Recommended Practices (ECE/TRADE/435)
Labelling	All seed that is determined to meet the Standard must be labelled with an official certification label.	Section VII Provisions concerning marking Annex V: Label	Guide on Operating a Seed Potato Certification Service (ECE/TRADE/434) Guide to Seed Potato Lot Inspection: Recommended Practices (ECE/TRADE/435)

*Seed potato may also be derived from clonal selection.

IV. Standards and regulations adopted by other international and regional organizations

There are a range of other international standards and regulations that may apply to seed potatoes. Examples include:

- European Union (EU): EU legislation on the marketing of seed potatoes and plant health
- International Plant Protection Convention (IPPC): the International Standards for Phytosanitary Measures (ISPMs)
- European and Mediterranean Plant Protection Organization (EPPO): recommended certification scheme for seed potatoes
- North American Plant Protection Organization (NAPPO): NAPPO Regional Standard for Phytosanitary Measures (RSPM#3)

United Nations Economic Commission for Europe Standard S-1 concerning the certification and commercial quality control of seed potatoes

I. Definition of produce

This Standard applies to seed potatoes which are certified by the Certifying Authority (CA) as meeting the specific requirements of this Standard. Seed potatoes[1] are tubers (including minitubers) and potato micropropagative material of cultivated tuber-forming *Solanum* spp. for planting.

This Standard does not apply to potatoes intended for planting for:

- Trials or scientific purposes
- Selection work.

These, however, may be covered by documentary confirmation of quality by the CA.

II. Provisions concerning the variety

Varieties shall be accepted for certification under the Standard if an official description and a reference sample can be made available to the CA.

The variety should be distinct, uniform and stable according to the guidelines of the International Union for the Protection of New Varieties of Plants (UPOV) and have a denomination allowing its identification.

III. Provisions concerning quality

The purpose of the Standard is to define the quality requirements of seed potatoes for certification and subsequent marketing.

A. Minimum requirements

Seed potatoes shall meet the minimum classification tolerances for diseases, pests and other defects likely to impair their quality as seed (annexes I–IV).

The skin of seed potatoes shall be substantially dry and the tubers of normal shape for the variety.

Neither growing crops of seed potatoes nor seed potato tubers shall be treated with products that prevent long term sprouting.

B. Classification

Seed potatoes shall be classified by the CA according to the standards given below and the number of field generations (G). Their classification shall be subject to official control in the producing country. Seed potatoes can be placed in classes within each of three categories as defined below:

Category 1: Pre-basic seed potatoes

These are seed potatoes of generations prior to Basic seed:

(a) Pre-basic tissue culture (PBTC) class seed potatoes (G0) PBTC shall be minitubers, microtubers, microplants or plantlets [to check definitions] directly derived from initial

[1] As defined in International Standard for Phytosanitary Measures 33 (ISPM 33, 2010).

stock [Add in annex 1 initial stock information], and shall be produced in accordance with the requirements specified in the relevant annexes I, II, III and IV. The certification of PBTC seed potatoes is restricted to one generation.

(b) Pre-basic class seed potatoes shall be generations of seed, meeting the requirements specified in annexes II, III and IV. [to check text in Annex I and possibly include additional information for plant].

[Move to annex: Plantlets for field planting

(a) Plantlets for field planting class seed potatoes shall be directly derived from initial stock or true potato seed, shall be produced in accordance with the requirements specified in annexes I, II, III and IV.

(b) Plantlets for field planting class seed potatoes shall be generations of seed, meeting the requirements specified in annexes II, III and IV.]

Category 2: Basic seed

These are seed potatoes descended directly from Pre-basic or Basic category seed and are mainly intended for the production of certified seed potatoes.

Seed potatoes shall be classified as either Basic I or Basic II, according to the minimum requirements given in annexes II, III and IV.

Category 3: Certified seed

These are seed potatoes descended directly from Pre-basic, Basic or Certified category seed and are mainly intended for the production of potatoes other than seed potatoes.

Seed potatoes shall be classified as either Certified I or Certified II, according to the minimum requirements given in annexes II, III and IV.

Derogation from classification

Producing countries are, however, free to create within the categories and classes provided for in Section III B Classification, classes which are subject to specific requirements.

Field generation

Each class may be additionally classified according to the number of field generations (G1, G2 etc.). The final designation of a class will therefore contain a class name and may contain a field generation record (e.g. Basic I G3, Certified I G3).

IV. Provisions concerning inspections for certification

Inspection is the examination of plants, tubers, containers, equipment or facilities, to assess compliance with regulations of the Standard.

Inspections are carried out officially or under official supervision. [to insert a definition in the annex]

To ensure traceability and compliance, the results of the inspections must be recorded and be available to the CA.

To perform inspections, the inspector must have completed the appropriate training and be recognized as competent by the CA.

It may be necessary to perform tuber testing to support certification and determine the grade of a crop.

A. Field inspection

All seed potato crops to be certified under the Standard must be inspected during growth to ensure compliance with the minimum conditions set out in annex II, and to verify the purity and identity of the variety. A minimum of two inspections is recommended for growing plants. The CA shall specify the inspection procedures taking into account aspects of annex II section B. In general, the procedures should allow the inspector to inspect at random a representative sample of plants from a crop. The CA should also adopt a risk-based approach and may inspect ware potato crops growing in the vicinity of seed potato crops.

The field inspection is usually based on a visual assessment of the crop to detect symptoms of diseases and off-types. However, field inspectors may use appropriate diagnostic tests to determine the pathogens causing observed disease symptoms. Additional testing may be used to resolve an issue on varietal purity and identity. The CA may permit roguing removal of all tubers and the foliage of a plant prior harvesting) within specified limits to meet the tolerances specified in annex II, section A points 2 to 4.

If the results of the field inspection do not comply with the requirements set out in annex II, the crop is to be rejected or downgraded.

B. Evaluation of diseases before certification (post-harvest evaluation)

The verification of virus and other pathogens in the tubers may be determined by visual examination of direct progeny plants in greenhouse or field, and/or laboratory testing. Laboratory testing may be conducted on the tubers, or on leaves from the progeny plants.

The tuber sample should be collected either post-harvest or after the haulm has been killed and without regrowth to avoid the risk of virus infection.

Minimum conditions for certification are set out in annex IV.

[Review/check annex IV – varietal purity, direct pro]

C. Lot inspection

All seed potato lots to be certified under the Standard must be inspected before marketing to ensure that the tubers within a lot comply with the minimum conditions set out in annex III. Inspection is done after sorting and sizing but before dispatch.

Sampling of seed potatoes for inspection and certification purposes shall be carried out officially or under official supervision. A randomly collected representative sample of the seed potato tubers from the lot should be inspected for tuber size, grade and quality. The tubers need to be sufficiently clean to allow for a visual inspection, i.e. no caked dirt. During the inspection process some tubers of the sample may be cut to establish the presence or absence of internal defects.

Additional samples may be taken for inspection, and/or the lot be re-graded, to ensure it complies with the specified standard in order to be certified. [Doesn't specify how much should be sampled, or by whom. Suggestion to add text on sealing, weighing, etc.]

Other conditions may be assessed at the time of the lot inspection, including the label, seal, weights. [To check against the guide]

V. Provisions concerning post control trials

The examination of randomly selected certified seed lots in comparative field trials enables the assessment of the conditions specified in the Standard. Such trials can be conducted to ascertain the effectiveness of the certification system, and to check the quality of certified seed potatoes against the requirements of the Standard.

When interpreting the results of such trials, consideration must be given to statistical variability due to sampling. The guidelines for organizing such trials, set out in annex VI, should be followed. The information gained from such trials may be used by the CA to implement corrective action, if required.

[To be moved to annex: The results of such trials shall be treated in confidence, but on request the results relating to individual consignments may be exchanged between the CA of the importing and exporting countries concerned.]

VI. Provisions concerning sizing

Pre-basic TC are exempt from the minimum sizing requirements.

To determine compliance with tuber sizing, a representative sample should be inspected during the lot inspection. The seed size should be assessed using the square gauge.

The lot shall conform to the distribution of tuber sizes of the harvested crop within the size specified on the official label.

Unless the buyer and seller agree to deviate from the minimum size and/or maximum variation in size of tubers, the following will apply:

- The minimum size of tubers must be such that they do not pass through a square gauge of 25 mm; for varieties having, on average, a length of at least twice the greatest width, the square gauge must not be less than 25 mm. In the case of tubers, which are too large to pass through a square gauge of 35 mm, the difference between the maximum and minimum limits of size should be stated in multiples of 5 mm.
- The maximum variation in size between tubers in a lot must be such that the difference between the dimensions of the two square gauges used does not exceed 25 mm.

Tolerances for sizing*

Minimum size tolerances in per cent by weight of tubers	
10 %	With a maximum deviation of 5 mm from the minimum size indicated for lots with tubers having a length of at least twice their maximum width
3 %	For all other lots
Maximum size tolerances in per cent by weight of tubers	
3 %	Larger than the maximum size indicated

*[Note: table may need clearer headings.]

VII. Provisions concerning presentation

A. Condition of containers

Bags must be new; other containers may be reused provided that they are clean.

B. Closing of containers

Containers shall be closed officially or under official control in such a manner that they cannot be opened without damaging the official sealing device or without leaving evidence of tampering on the official label provided for in Section VIII A Official label.

Re-closing (e.g. in the case of a new inspection, or technical problem with the closing) shall be carried out only by the CA or under its official control.

If the official seal has been broken and a new label is necessary, this must show the particulars which appeared on the original label and, where appropriate, a new official seal must be applied by the CA.

C. Nature of contents of containers

Each container shall contain tubers of the same variety, category, class, size and origin.

A lot should be sufficiently homogeneous which means that seed potatoes within different containers are as uniform as is practical and will not vary excessively in composition and appearance.

VIII. Provisions concerning labelling

A. Official label

Each container shall bear on the outside an official label in accordance with annex V. A label shall only be used once.

The label shall be white with a diagonal purple line for Pre-basic seed, white for Basic seed, and blue for Certified seed.

A reference to the UNECE Standard may be included on the label.

B. Official statement

Each container may have on the inside an official statement of the same colour and showing at least the particulars 3, 5 and 7 as indicated in annex V. The statement shall be so worded that any confusion with the official label referred to in Section VIII.A shall be avoided.

This statement is not necessary when an adhesive label or a label of untearable material is used.

C. Supplier's (non-official) label

Each container may be accompanied by a non-official label of the supplier.

D. Chemical treatment

The name of the active substance of any chemical treatment of the seed potatoes shall be stated on the outside of each container, which may be duplicated on the inside of each container.

E. Re-packaging and re-labelling

The re-packaging and re-labelling of a certified seed potato lot may be conducted in an appropriate facility under the official supervision of the CA. Re-packaging and re-labelling shall be carried out by methods which ensure the original integrity of the seed potatoes, and traceability. That includes avoiding any contamination or introduction of foreign material, e.g. pest, earth or extraneous matter, and minimizing the risk of introducing defects.

The approved operator responsible for re-packaging and re-labelling of seed lots shall keep detailed records of the operations and keep the original label. Such information must be made available to the CA.

The particulars which appeared on the original label, the date of the re-closing, the country of production, and the authority concerned by the re-packaging and re-labelling must be

stated on the label. If the lot has been modified due to resorting, regrading or resizing, a new inspection must be conducted and a new inspection report and labels must be issued.

IX. Provisions concerning traceability

A system of documentation should be maintained of all relevant data to ensure traceability of a given seed lot. The official label is a critical component of any traceability system.

The CA should have access to all relevant data.

In particular, the CA should have the ability to trace the history of a given seed lot, including:

- the variety (including any clone reference)
- the generation
- the source of the origin of the propagating material
- the dates and timing of critical steps of seed production, relating to the specific crop
- locations of the seed lot [to check against the guide]
- testing and inspection results concerning the regulated criteria of seed lot
- the identification of the seed supplier and destination and recipient of the seed lot.

The records of this information should be kept for at least 3 years.

Adopted 1963, also as European Standard No. 19

Last revised [202x]

Annex I

Minimum conditions to be satisfied in the production of Pre-basic Tissue Culture (TC) seed potatoes

[Mother plants can be used for initial stock.]

1. Pre-basic Tissue Culture (TC) seed potatoes must be produced from initial stock

2. The initial stock used to produce pre-basic Tissue Culture (TC) seed potatoes shall be known to be free from, at least, the following pests:

- *Clavibacter michiganensis* spp. *sepedonicus* (ring rot)
- *Ralstonia solanacearum* (brown rot)
- *Pectobacterium* spp. and *Dickeya* spp. (syn. *Erwinia* spp.)
- *Candidatus* Liberibacter *solanacearum*
- *Candidatus* Phytoplasma *solani*
- Potato spindle tuber viroid
- Potato viruses X, Y, S, M and A
- Potato Leaf Roll Virus

3. The satisfaction of the conditions under item 2 shall be established by appropriate tests as approved by the Certification Authority (CA).

Production of Pre-basic TC seed potatoes (e.g. minitubers)

4. The facilities and procedures used for the production of Pre-basic TC seed potatoes may be approved at the discretion of the CA.

The facilities and procedures used for the production of Pre-basic TC seed potatoes should include:

- Measures to avoid contamination from pathogens and pests, e.g. protected environment, double door entry, protective clothing, dedicated footwear or disinfection. The record-keeping system should document the source of the material and the volume of production.
- Pest-free growing medium.
- All reasonable husbandry practices for the prevention or spread of pathogens and pests.

5. The satisfaction of conditions and the tolerances prescribed for Pre-basic TC seed potatoes in annexes II, III and IV shall be established by official inspection and/or testing as approved by the CA.

Annex II

Minimum conditions to be satisfied by the crop: field inspection procedures

A. Minimum conditions to be satisfied by the crop

1. The field shall not be contaminated by *Globodera rostochiensis* (Woll) nor *Globodera pallida* (Stone).

2. The proportion of growing plants affected by blackleg shall not exceed:

(a) In crop for the production of Pre-basic category seed, 0 per cent

(b) In crop for the production of Basic I class seed, 0.5 per cent and of Basic II class seed, 1 per cent

(c) In crop for the production of Certified I class seed, 1.5 per cent and of certified II class seed, 2 per cent.

3. The proportion of growing plants showing symptoms of virus diseases shall not exceed:

(a) In crop for production of Pre-basic TC class seed, 0 per cent

(b) In crop for production of Pre-basic class seed, 0.1 per cent

(c) In crop for production of Basic I class seed, 0.2 per cent

(d) In crop for production of Basic II class seed, 0.8 per cent

(e) In crop for production of Certified I class seed, 2 per cent

(f) In crop for production of Certified II class seed, 6 per cent.

4. The proportion of growing plants not true to the variety and plants of another variety should not exceed:

(a) In crop for production of Pre-basic TC class seed, 0 per cent

(b) In crop for production of Pre-basic class seed, 0.01 per cent

(c) In crop for production of Basic category seed, 0.25 per cent

(d) In crop for production of Certified category seed, 0.5 per cent.

5. The crop shall be free from: [Zero tolerances?]

(a) *Synchytrium endobioticum* (Schilb) Perc.

(b) *Clavibacter michiganensis* spp. *sepedonicus* (Spieck. and Kotth.) Skapt. and Burkh.

(c) *Ralstonia solanacearum*

(d) Potato spindle tuber viroid

(e) Tomato Stolbur

(f) *Candidatus* Liberibacter *solanacearum*

(g) *Candidatus* Phytoplasma *solani*

6. Depending on the circumstances and character of potato production in the country, requirements for isolation and rotation of the crop may be considered.

7. The satisfaction of the above mentioned standards or other conditions shall be established by official inspection and/or testing.

B. Field inspection procedures

All seed potato crops to be certified under the Standard must be inspected during growth.

Field inspections should be carried out in accordance with the following procedures.

1. Level and timing of inspection

A minimum of two inspections is recommended for growing plants. Where possible, inspections should start at or shortly before the flowering stage.

The number of plants inspected should be sufficient to ensure that, with an appropriate level of confidence, the tolerances given in annex II A are not exceeded. Table 5 and 6 in annex IX provide guidance on the number of plants to sample and maximum allowable number of each fault in each sample size.

The number of plants affected by the diseases listed in annex II, section A, points 2 and 3 and those not true to variety or of another variety (annex II, section A, point 4) should be recorded separately in the field inspection report and each expressed as a percentage of the total number of plants inspected in the sample.

Observation of symptoms of the diseases specified in annex II A 5, during inspection, or at any other time, will result in the crop being rejected, if confirmed by appropriate diagnostics.

During each crop inspection the inspector should verify the purity and identity of the variety. [It was proposed to include this in IV A, but it is also important here. Consider keeping in both places]

The first generation derived from Pre-basic TC class seed potatoes should be inspected at a more intensive rate to identify off-types.

2. Second opinion inspections

In the case of a disputed inspection, growers will be entitled to ask for a confirmatory inspection to be conducted by another inspector.

For more information on field inspection procedures, please consult, the Guide to Seed Potato Field Inspection: Recommended Practices

Annex III

Minimum quality conditions for lots of seed potatoes [To be revised]

A. Tolerances for defects and disorders allowed for seed potato tubers

1. Presence of earth and extraneous matter

- Pre-basic TC and Pre-basic — 1 per cent by weight
- Basic and Certified — 2 per cent by weight

2. Dry and wet rot not caused by pests listed under section B below, including wet breakdown due to extreme temperatures

- Pre-basic TC — 0 per cent by weight
- Pre-basic — 0.2 per cent by weight
- Basic and Certified — l per cent by weight, of which wet rot cannot exceed 0.5 per cent

3. External defects

Tubers with the following external defects are countable:

- Pressure bruises: spots of more than 10% of the tuber surface and discolouration of more than 10 mm in depth
- Mechanical damage: more than 10% of the total tuber weight (when removed by a straight cut) is affected or any damage which is not healed
- All categories — 3 per cent by weight

4. Scab caused by *Streptomyces* spp. (common and netted): Tubers affected over a specified per cent of their surface (see annex VIII)

- Pre-basic TC (0% surface cover) — 0 per cent by weight
- All other categories (>33.3% surface cover) — 5 per cent by weight

5. Powdery scab: Tubers affected over a specified per cent of their surface (see annex VIII)

- Pre-basic TC (0% surface cover) — 0 per cent by weight
- Pre-basic (> 10% surface cover) — 1 per cent by weight
- Basic and Certified (> 10% surface cover) — 3 per cent by weight

6. Rhizoctonia: Tubers affected over a specified per cent of their surface (see annex VIII)

- Pre-basic TC (0% surface cover) — 0 per cent by weight
- Pre-basic (> 1% surface cover) — 1 per cent by weight
- Basic and Certified (> 10% surface cover) — 5 per cent by weight

7. Shrivelled tubers: Tubers which have become excessively dehydrated and wrinkled, including dehydration caused by silver scurf

- Pre-basic TC — 0 per cent by weight
- Pre-basic — 0.5 per cent by weight
- Basic and Certified — 1 per cent by weight

8. Chilling injury

- Pre-basic TC 0 per cent by weight
- Other categories 2 per cent by weight

9. Pest damage (e.g. slugs, wireworms, tuber moth, flea beetles): Tubers with more than 10 holes or with more than 3 holes of 5 mm or more in depth are countable

- Pre-basic TC 0 per cent by weight
- Other categories 4 per cent by weight

10. Total tolerance for items 2 to 7:

- Pre-basic TC 3 per cent by weight
- Pre-basic 5 per cent by weight
- Basic and Certified 6 per cent by weight

B. Zero tolerances

The seed potatoes shall be free from *Globodera rostochiensis* (Woll) and *Globodera pallida* (Stone), *Synchytrium endobioticum* (Schilb.) Perc., *Clavibacter michiganensis* spp. *sepedonicus* (Spieck. and Kotth.) Skapt. and Burkh., *Ralstonia solanacearum* (E.F. Smith) E.F. Smith, Potato spindle tuber viroid, Tomato Stolbur, [*Candidatus* Liberibacter *solanacearum]*, *Meloidogyne chitwoodi* and *fallax*, *Ditylenchus* destructor and *Phthorimaea operculella* (Zeller).

C. Tuber inspection procedures

All seed potato lots to be certified under the Standard must be inspected before marketing.

For tuber inspection procedures, follow the Guide to Seed Potato Lot Inspection: Recommended Practices.

Sampling

Sampling of seed potatoes for inspection and certification purposes shall be carried out officially or under official supervision. Tuber samples, representative of the lot, shall be taken at a minimum rate of 20 kg for each 10 000 kg and may be collected either during grading or from at least two containers randomly. More samples may be taken if one of the initial samples is close to tolerance.

Annex IV

Minimum conditions to be satisfied by direct progeny of seed potatoes: post-harvest evaluation procedures

A. Minimum conditions to be satisfied by direct progeny of seed potatoes

1. Pre-basic seed

(a) The proportion, in direct progeny, of plants of other varieties should be 0 per cent for Pre-basic TC class.

The proportion, in direct progeny, of plants not true to the variety and of other varieties should not exceed 0.01 per cent for Pre-basic class.

(b) The proportion, in direct progeny, of plants showing symptoms of virus diseases should not exceed:

- 0 per cent for Pre-Basic TC class
- 0.5 per cent for Pre-Basic class.

2. Basic seed

(a) The proportion, in direct progeny, of plants not true to the variety and of other varieties should not exceed 0.25 per cent.

(b) The proportion, in direct progeny, of plants showing symptoms of virus disease should not exceed 1 per cent for Basic I class seed, and 4 per cent for Basic II class seed.

3. Certified seed

(a) The proportion, in direct progeny, of plants not true to the variety and of other varieties should not exceed 0.5 per cent.

(b) The proportion, in direct progeny, of plants showing symptoms of virus disease should not exceed 8 per cent for Certified I class seed and 10 per cent showing virus disease for Certified II class seed.

The tolerances allowed under points 1(b), 2(b) and 3 are applicable only where the virus diseases are caused by viruses already prevalent in countries applying the UNECE Standard for Seed Potatoes.

The incidence of the virus and/or other pathogens in the direct progeny may be determined by inspection and/or testing of tubers or plants derived from a sample of tubers from the crop, i.e. post-harvest evaluation.

B. Post-harvest evaluation procedures

The tolerances in the Standard for the post-harvest evaluation are the “Minimum conditions to be satisfied by direct progeny of seed potatoes” (Section A).

Sampling may be done just after haulm destruction is complete, during the harvest or from storage.

The CA shall specify the sample size depending on field size, category, tolerance and the desired confidence level (see annex IX. Sampling tubers for virus testing)

Tuber dormancy may be broken chemically and/or by temperature treatment.

The requirement for a post-harvest evaluation may depend on “regulated haulm destruction dates” or for specific reasons defined by the CA depending on local circumstances.

There are two options for post-harvest evaluation:

(i) Visual examination of growing plants (grow-out)

The grow-out, usually aimed at virus indexing, may be done in field or greenhouse. The evaluation may be visual with confirmation by laboratory testing as required.

Should a variety mixture and/or chemical damage be observed during a grow-out post-harvest evaluation, the CA shall take appropriate action.

Trueness-to-type can only be assessed in a field grow-out.

(ii) Laboratory test

A laboratory test for viruses may be done on leaves of a grow-out sample by ELISA (Enzyme linked immunosorbent assay), PCR (Polymerase chain reaction) or other appropriate technique, on sprouts or sprouted tubers by ELISA or PCR and/or on tubers by PCR.

A laboratory test for the bacterial diseases referred to in annex III.B may be done by tuber testing using ELISA, PCR and/or IF (Immunofluorescence test) and additional confirmation techniques (plating, bio-assay).

Annex V

Label

A. Particulars

1. "UNECE Standard", if appropriate
2. Nature of the contents: "Seed potatoes"
3. The Certifying Authority (CA) or its recognized initials
4. Country and/or region of production
5. Reference number of the lot, including where appropriate the producer's identification number
6. Month and year of closing
7. Variety
8. Category and class and, where appropriate, record of field generation
9. Tuber size
10. Declared net weight

B. Minimum dimensions

110 x 67 mm.

Annex VI

Guidelines for organizing post control trials of plots grown from samples collected from certified lots of seed potatoes

A. Purpose of the post control trials (comparative trials)

The examination of seed potatoes in plots enables the assessment of the conditions specified in annex IV for randomly selected seed lots put on the market.

B. Organization

1. Responsibility for the sampling

The sampling shall be done under the authority of the CA.

2. Sampling

- The lot as defined in annex VII is the unit represented by at least one sample.
- A sample consists of 110 tubers, taken at random from the lot.
- The sample shall be placed in a sealed sack; its label shall bear the information mentioned in annex V.

3. Trial fields

- Planting should be done in plots of 100 plants. The plots should be grouped by variety so as to facilitate comparison.
- Fertilization must be moderate, especially N, to facilitate virus expression.

4. Visual examination

To be accurate, the visual examination shall in general be carried out in two stages, with an interval of 10–15 days between them. Laboratory testing may support visual examination. Primary viral infections shall not be taken into consideration.

5. The results of post control trials

The results of comparative field trials shall be treated in confidence, but on request the results relating to individual consignments may be exchanged between the CA of the importing and exporting countries concerned.

Annex VII

Definitions of terms applicable to the Standard

The definitions provided herein apply specifically to certified seed potatoes moving into international trade under provisions of this Standard and their meaning may therefore differ from their classical meaning.

Incorporation of the terms in this glossary signifies their unique use by countries, which have adopted the Standard.

Blackleg:

Commonly used name of a bacterial disease of potatoes, generally caused by *Pectobacterium atrosepticum* (syn. *Erwinia carotovora* subsp. *atroseptica*). Similar symptoms may, however, be caused by *Pectobacterium carotovorum* (formerly E. *carotovora* subsp. *carotovora*) and *Dickeya* spp. (syn. E. *chrysanthemi*).

Certification:

An official control procedure, which aims at ensuring the production and supply of seed potatoes which satisfy the requirements of this Standard.

Certifying Authority (CA):

Organization(s), agency or agencies designated by government and/or industry to administer the certification of seed potatoes.

Chilling injury:

Consists of internal damage to the tuber caused by exposure to temperatures slightly below or slightly above freezing, even for a relatively short period of time. A greyish discoloration predominantly of the vascular tissue can occur within hours after exposure. Chilling injury results in a tuber with no, or very poor, germination.

Clonal selection:

A system of potato propagation that starts from selected plants that fulfil the requirements of the pre-basic seed.

Clonal stock:

Propagation stock of a particular variety descended from a clonally selected mother plant. Clonal stocks are subject to visual inspection (diseases and varietal identity).

Consignment:

A quantity of seed potatoes consisting of one or more lots which have been consigned to one commercial party and is covered by one set of documents.

Container:

Bags of any size, bins, shipping containers and bulk transport such as trucks and railway cars.

Contaminated field:

A field made subject to regulatory action because of the presence of a designated pathogenic organism in the soil.

Crop

A defined area of seed potatoes that is limited to one variety and class and is registered as a single unit for certification. The origin is documented.

Direct progeny:

[definition to be added]

Disease:

Any disturbance of a plant caused by pathogenic organisms which interferes with its normal structure, function or economic value.

External defects:

Any tuber defect that can be detected externally. Countable tubers are those which may have a negative impact on yielding capacity or storability, or which are likely to lead to secondary infection.

Field:

A defined area of land used for cultivation of seed potatoes.

Free from:

Not present in numbers or quantities that can be detected by the application of appropriate sampling, inspection and testing procedures.

Field generation number:

The number of growing cycles since the first introduction in the field after micropropagation or clonal selection.

Homogeneous:

Uniform in composition and appearance.

Initial stock:

Initial or nuclear stock refers to the pathogen-tested microplants that form the basis of tissue culture seed potato propagation cycle.

Inspection: [Delete?]

Visual examination of plants, tubers, container, equipment or facilities by an authorized person, to determine compliance with regulations.

Inspection under official supervision:

[definition to be added]

Lot:

A quantity of seed potatoes of the same variety and class, derived from the same crop and bearing a unique reference number. There may be multiple lots per crop.

Micropropagative multiplication:

The process of propagating microplants of initial stock by taking nodal cuttings under aseptic conditions to produce large numbers of microplants. The resulting microplants are retained for further multiplication cycles or grown to maturity to provide harvestable tubers usually of the class PBTC.

Mother plant:

An identified plant or tuber from which material is taken for propagation. The mother plant is used for initial stock or for clonal selection.

Origin:

The crop from which the seed potatoes are derived and which can be identified.

Phytosanitary provisions:

Provisions in accordance with the International Plant Protection Convention.

Plantlet:

[definition to be added]

Post control trials:

[definition to be added]

Potato leaf roll disease:

A severe virus disease caused by potato leaf roll virus (PLRV). Plants are usually smaller than healthy plants and sometimes stunted. The top of the plant is paler and the leaves are more erect than usual. Older lower leaves roll upward and become brittle, such that they can be easily broken (metallic rustling) when squeezed gently. Primary infection may cause a slight rolling of the upper leaves, sometimes accompanied by discoloration.

Primary virus infection:

Infection occurring during the current growing season and not arising from the seed tuber.

Quality:

The sum of all characteristics that determine the acceptance of seed potatoes in relation to the specifications of this Standard.

Quality Control:

The control by the CA of all activities encountered in the process of producing and marketing seed potatoes in conformance with the Standard.

Quality pest:

A pest carried by planting material, subject to official regulatory control, but not a quarantine pest.

Quarantine pest:

A pest of potential national economic importance to the country thereby endangered and not yet present there, or present but not widely distributed and being actively controlled.

Regulated non-quarantine pest:

A non-quarantine pest whose presence in plants for planting affects the intended use of those plants with an economically unacceptable impact and which is therefore regulated within the territory of the importing contracting party.[2]

Rot:

Rot is the disintegration of tissue as a result of the action of invading organisms, usually bacteria or fungi[3] Rot can be triggered by environmental factors. A tuber rot may be classified as either a wet (also called soft) or dry rot according to its external and internal appearance, and the diseases causing these types of rots are specified in the List of Diseases and Pests.

Wet rot: tuber softening to maceration, associated with a fluid exudate, which has arisen due to a primary or secondary bacterial and/or fungal infection.

[2] International Standard for Phytosanitary Measures 5 (ISPM 5, 2012).

[3] From “Holliday P (1989). A Dictionary of Plant Pathology. Cambridge University Press.

Dry rot: tuber tissue exhibiting a sunken, necrotic lesion without the loss of fluid exudates, which may remain localized or enlarge by becoming wrinkled and mummified to encompass the whole tuber.

Sampling:

The procedure of drawing at random a number of tubers, plants or parts of plants, which may be taken as representative of the lot or the field.

Seed potato:

Tubers (including minitubers) and potato micropropagative material of cultivated tuber-forming Solanum spp. for planting (International Standard for Phytosanitary Measures 33, ISPM 33, 2010)

Seed owner:

[definition to be added]

Severe Mosaic:

Disease symptom caused by a virus, characterized by discolouration and distortion of foliage, and easily discernible by visual inspection.

Sprout inhibitor:

A chemical substance, applied either to the plants during the growing season or to the tubers after harvest, which suppresses or prevents the normal development of sprouts.

Substantially free:

Not present in numbers or quantities in excess of those that can be expected to result from and be consistent with normal handling and good cultural practices employed in the production and marketing of the commodity.

Testing:

The use of one or more procedures, other than inspection for determining the presence of a pathogenic agent or for varietal identification.

Traceability:

A system of documentation that enables the source and performance of a lot to be tracked during the classification process.

True potato seed:

[definition to be added]

Virus diseases:

Manifest themselves by deformations of the foliage with or without discolouration. The determination is based on the count of plants with virus symptoms in a crop at the time of the inspection. Simple diagnostic field kits are available that can aid identification of many of the viruses and there are laboratories that offer comprehensive testing, if required. If a virus is suspected the inspector may seek confirmation using approved diagnostic tests.

Virus symptoms in potato plants can be discolouration, mottling, rugosity, crinkling, rolling and brittleness of the leaves or dwarfing of the plant, as with mosaic or/and potato leaf roll disease. It is important to note that the actual virus, virus strain, potato variety, environmental conditions all may affect the expression of the virus symptoms.

The following viruses or virus combinations are normally associated with symptoms of virus:

PLRV, PVY, PVA or PVM

PVY + PVX, PVA + PVX or PVX + PVS.

PVS, PVX, and other viruses, depending on the strain and variety, may be latent or show mild symptoms.