

INF.1

Note by the secretariat: This document contains the text of the standard including the amendments proposed to the specialized section.

UNECE STANDARD S-1
concerning the certification and
commercial quality control of

SEED POTATOES

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INTRODUCTION

1 About UNECE

UNECE was set up in 1947 by ECOSOC. It is one of five regional commissions of the United Nations.

Its primary *goal* is to encourage greater economic cooperation among its member States.

It *focuses* on economic analysis, environment and human settlements, statistics, sustainable energy, trade, industry and enterprise development, timber and transport.

UNECE *activities* include policy analysis, development of conventions, regulations and standards, and technical assistance.

UNECE has *55 member States*. However, all interested UN member States may participate in its work. Over 70 international professional organizations and other non-governmental organizations take part in UNECE activities.

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2 History and goals of the Working Party on Agricultural Quality Standards

2.1 History

In October 1949, the Economic Commission for Europe's Committee on Agricultural Problems established the Working Party on Standardization of Perishable Foodstuffs to determine common standards for perishable foodstuffs" and to study steps to be taken on the international level in order to secure the general adoption of standards and control systems". Later, the responsibility of the Working Party was extended to cover non-edible horticultural produce and quality development which is reflected in its present name.

The activities have led to the elaboration of a wide range of UNECE standards for fresh fruit and vegetables, dry and dried fruit, seed potatoes, eggs and egg products, meat and cut flowers. Standards for fruit juices and quick frozen foods have been elaborated in Joint ECE/Codex Alimentarius Groups of Experts and are now further developed in the relevant Codex bodies.

2.2 Goals

UNECE standards harmonize existing national commercial quality standards for perishable produce to:

- Facilitate fair international trade and prevent technical barriers to trade
- Improve producers' profitability and encourage production of high quality produce
- Protect consumers' interest

With the Working Party and five Specialized Sections UNECE groups provide a forum where countries can discuss all issues of commercial quality that may arise from their domestic markets and which have an implication on international trade. The groups offer assistance to countries in transition by organizing workshops on the harmonization of national standards with international commercial standards.

3 History, goals and scope of the UNECE standard for seed potatoes

3.1 History

Work on the UNECE Standard for Seed Potatoes began in 1958.

At the 9th session of the Working Party:

Some disagreements were raised concerning the nomenclature of the different categories of seed potatoes. The Group of Experts (from the Federal Republic of Germany, Netherlands and United Kingdom) was charged of preparing an analysis of existing national regulations and drafting recommendations for international standardization.

Provisional recommendations were adopted in 1960 at the 10th session of the Working Party in order to try them out and revise them according to the experience.

The first version of the text was adopted by the Working Party in 1963 at its 16th session. The standard has been regularly updated since then.

3.2 Goals and scope

The goal of the Standard is to act as world reference to facilitate fair international trade by:

- creating a harmonized certification system
- promoting its use and
- defining harmonized quality requirements for seed potatoes

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

- varietal identity and purity;
- genealogy and traceability;
- diseases and pests;
- external quality and physiology;

- sizing and labelling;

As a consequence, the Standard considers issues falling the WTO-TBT agreement under as well as the WTO-SPS agreement.

4 Application of the Standard

4.1 The Standard adopted by the Working Party is recommended to countries for application as defined below.

4.2 Countries applying this Standard should notify the UNECE Secretariat of their National Designated Authority (NDA) responsible for its implementation.

4.3 Application means the use of the UNECE Standard for export and import. This means for

Export: All seed potatoes certified and labelled for export by the NDA meet at least the requirements of the Standard.

Import: Seed potatoes certified and labelled according to the UNECE Standard are accepted for import by the NDA for parameters covered by the Standard except where additional or more stringent requirements are applied by the country in respect to diseases and pests if:

- the same requirement is applied to domestic production AND
- these requirements are justified to prevent introduction or spread of these diseases and pests which do not exist there or which seem particularly injurious to the crops in that country or in any part of its territory.

4.4 The responsibility of the NDA is to ensure the application of the provisions and conditions as specified in the standard. The responsibility for the quality of the lot remains with the owner.

4.4.5 The NDA shall notify the UNECE secretariat of each additional or more stringent requirement together with technical or scientific justification.

4.5.6 The application of the Standard is without prejudice of any other legislation concerning industrial of commercial property, protection of crops, and health of persons and animals.

5 Development of the standard

For the development of the standard and the work of the Specialized Section, the Working Procedures of the Working Party on Agricultural Quality Standards and its specialized sections apply and can be obtained from the UNECE Secretariat. According to these procedures all UN members can participate with the same rights.

6 Cooperation with other international organisations

6.1 *European Union*

In July 1966 the Council of the European Union adopted a Council Directive on the marketing of seed potatoes, applicable to the production with a view to marketing, and to the marketing of seed potatoes within the Community (Directive 2002/56/EC-OJ L 193, 20.07.2002 former 66/403/EEC).

Within its recitals, it was stated "it is desirable to establish a uniform certification scheme for the Community based on the experience gained in the application of the scheme of the Economic Commission for Europe".

The above Directive envisaged that provisions should be made for authorizing the marketing within the Community of seed potatoes harvested in third country where they afford the same assurances as seed potatoes officially certified within the Community and complying with the Community rules. The last Council Decision (Council Decision 95/513/EC, OJ L 296, 9.12.1995, p. 31) on the equivalence of seed potatoes produced in third countries established that seed potatoes harvested in the countries as specified and officially controlled by the relevant Authorities and which belong to the categories specified therein are equivalent to seed potatoes harvested within the Community. Seed potatoes shall be certified and their containers officially marketed and sealed in accordance with the UNECE Standard for Seed Potatoes recommended by the Working Party on Standardization of Perishable Produce and Quality Development of the UNECE. The Decision does not affect the requirements which member states establish under Council Directive 2000/29/EC (former 77/93/EEC) on protective measures against the introduction into the Member States organisms harmful to plants or plant products (OJ L 169, 10.7.2000, p.1)

6.2 *International Plant Protection Convention (IPPC)*

The purpose of the International Plant protection Convention (IPPC) is to secure a common and effective action to prevent the spread and introduction of pests of plants and plant products, and to promote appropriate measures for their control.”

The Convention extends to the protection of natural flora. It also includes both direct and indirect damage by pests, thus including weeds. The provisions extend to cover vehicles, containers, storage places, soil and other objects or material capable of harbouring plant pests.

National Plant Protection Organisations (NPPOs) and Regional Plant Protection Organisation (RPPOs) such as EPPO (see 6.2.1) and NAPPO (see 6.2.2) work together to help contracting parties meet their IPPC obligations. Legal texts are available (1952, 1979 & 1997).

This treaty is managed by the IPPC Secretariat in the FAO Plant Protection Service and is recognized by the WTO-SPS agreement as the standard setting body on phytosanitary issues.

It is in this context that the phytosanitary certificates are issued. These, in the case of seed potatoes, facilitate international trade, by confirming compliance with the phytosanitary requirements of the importing country.

6.2.1 European and Mediterranean Plant Protection Organisation (*EPPO*)

In 1999, the (EPPO) published a recommended certification scheme for seed potatoes. This scheme focussed on micro- propagation as the recommended method of initial seed production (nuclear stock) and detailed the organisms, which should be tested for and the appropriate test procedures. Conditions and tolerances for the production of Pre-basic TC (mini-tubers) were also defined. The requirements for the certification of Pre-basic, Basic and Certified category seed potatoes were aligned, as far as possible, with those of the UNECE Standard for Seed Potatoes.

6.2.2 North American Plant Protection Organization (*NAPPO*)

In 1995, the NAPPO approved a potato standard: NAPPO Regional Standard for Phytosanitary Measures (RSPM#3), "Requirements for the Importation of potatoes into a NAPPO member country."

The standard identifies a number of pest risk management measures including federal or state/provincial Seed potato certification systems. Also, it established common criteria for limited generation certification systems and diagnostics. It includes lists of quarantine pests for the three NAPPO countries. The pest lists in the standard are reviewed on an annual basis to verify the technical justification for these pests to remain on quarantine lists and to incorporate new terminology from the International Plant Protection Convention (IPPC), e.g. regulated non-quarantine pests. The NAPPO standard does not deal with so-called quality pests because they are outside the mandate of the IPPC.

The revised standard will also include an appendix describing Potato virus Y, N strain (PVY_n) diagnostics. The next step will be to harmonize protocols among the three countries for nematode identification.

7 Editorial Note on this edition

UNECE STANDARD S-1
concerning the certification and
commercial quality control of

SEED POTATOES

I. DEFINITION OF PRODUCE

Seed potatoes are tubers or any other propagation material, other than true seed, of *Solanum tuberosum L.* acceptable for certification by the NDA in accordance with the provisions concerning the variety (see Section II)¹ and which, after regular inspection :

1. during growth
2. at sorting
3. during verification inspection

are certified by an officially approved body as suitable for reproduction.

This standard does not apply to seed potatoes :

1. intended for trials or scientific purposes
2. intended for selection work.

These shall, however, always be covered by documentary confirmation of quality by the NDA.

II. PROVISIONS CONCERNING THE VARIETY¹

Varieties shall be accepted into the Standard only if an official description and a reference sample are available from the NDA.

The variety should be distinct, uniform and stable according to the guidelines of 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 at the export control point, after preparation and packaging.

A. Minimum requirements

¹ Reservation from the United States to allow for further consultation.

Seed potatoes shall be substantially free from injurious diseases and pests and from any defects likely to impair their quality as seed. They shall be substantially dry outside and, in general, of normal shape for the variety.

These requirements shall be observed in conjunction with the standards and tolerances set out under B. Classification.

The condition of the seed potatoes at point of export should be such as to enable them:

- to withstand transport and handling
- to arrive in satisfactory condition at the place of destination.

Neither growing crops of seed potatoes nor seed potatoes shall be treated with sprout inhibitors.

B. Classification

Seed potatoes shall be classified according to variety and the standards given below. Their classification shall be subject to official control in the producing country. The NDA is responsible for the maintenance of all classification data to provide traceability. Seed potatoes shall be placed in two classes within each of three categories as defined below.

(i) Pre-basic Category Seed

These are seed potatoes of generations prior to basic seed

- (a) Pre-basic TC class seed shall be directly derived by micro-propagation and may be tissue culture plantlets or tubers of the first generation meeting the requirements specified in Annexes I, II, III and IV.
- (b) Pre-basic class seed shall be generations of seed multiplied in the field prior to basic seed, meeting the requirements specified in Annexes II, III, and IV.

(ii) Basic Category Seed

These are seed potatoes descended directly from Pre-basic or Basic category seed or produced under special provisions of a national certification scheme and are mainly intended for the production of certified seed potatoes.²

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

(iii) Certified Category Seed

²The representatives of the European Commission and France reserved their position on this issue.

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

(iv) Field generation:

Each class may additionally be classified according to the number of generations (FG1, FG2 etc.). The final designation of a class will therefore contain a class name and may contain a field generation record (e.g. Basic I FG3, Certified I FG3).

C. Derogation from classification

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

D. Lot

A lot should be sufficiently homogeneous.

~~D~~ E. Sampling

Sampling of seed potatoes for certification purposes shall be carried out officially or under official supervision.

~~E~~ F. Comparative tests

It is recommended that trials be established by the NDA to ascertain the condition of the seed potatoes certified according to this standard. The guidelines given in annex VI of this standard could be followed.

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

IV. PROVISIONS CONCERNING SIZING

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

The minimum size of tubers must be such that they do not pass through a square gauge of 25mm; 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 expressed in multiples of 5.

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 20 mm unless the buyer and seller agree to deviate from this requirement.

V. PROVISIONS CONCERNING TOLERANCES FOR SIZING

Minimum size tolerances in percent by weight of tubers	
10%	With a maximum deviation of 5mm 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 percent by weight of tubers	
3%	Larger than the maximum size indicated

VI. PROVISIONS CONCERNING PRESENTATION CONTAINERS

(i) *Condition of ~~units of presentation~~ containers*

~~Bags~~ Packages of up to 50 kg or one "hundredweight" (112 lbs avoirdupois) as the case may be, must be new, boxes may be reused provided that they are ~~Larger units of presentation~~ thoroughly cleaned and disinfected.

(ii) *Closing of ~~units of presentation~~ containers*

~~Units of presentation~~ 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 VI (i).

The official system of closing shall comprise either the incorporation into the system of the label mentioned above if it is without a string-hole or in all other cases, by the application of an official seal.

Re-closing shall be carried only by the NDA or under its control. ~~Only official control service may, in case of need, reclose a package or container.~~

(iii) *Weight*

~~With the exception of bags for Pre Basic TC, the packaging units for bags shall normally be 25, 50, 500, or 1000 kg net., but the "hundredweight" may be used in trade with countries using that measure, However other~~ The weight of seed potatoes in a container shall be agreed with ~~to may be used upon application to and with the agreement of~~ the NDA. ~~buyer and seller agree to deviate from these requirements.~~

(iv) ***Nature of contents of ~~units of presentation~~ containers***

Each ~~unit of presentation~~ **container** shall contain tubers of the same variety, category, class, size **band** and origin.

VII. PROVISIONS CONCERNING MARKING

(i) ***Official label***

~~Units of presentation~~ **Each container** shall bear on the outside an official label in accordance with annex V and which has not been previously used; the label shall be white with a diagonal purple line for pre-basic seed, white for basic seed and blue for certified seed. Reference to the UN/ECE Standard may be included on the label.

(ii) ***Official statement***

~~Units of presentation~~ **Each container** shall have on the inside an official statement of the same colour and showing at least the particulars indicated under 3, 5 and 7 in annex V. The statement shall be so worded that any confusion with the official label referred to in (i) shall be avoided.

This statement is not necessary when an adhesive label or a label of untearable material is used. The particulars given on the label may be indelibly printed on the unit of presentation in substitution for the official statement provided for above.

(iii) ***Re-labelling***

If a second check appears necessary, the authority which carried out the second check must be stated on the label, as well as the date of the re-closing. If a new label is necessary, this must show the particulars which appeared on the old label, the date of the re-closing and the authority concerned.

(iv) ***Supplier's label***

~~The units of presentation~~ **Each container** may be accompanied by a special label of the supplier.

(v) ***Chemical treatment***

The nature of the active substance of any chemical treatment of the seed potatoes shall be indicated on the outside of ~~the units of presentation~~ **each container**, on a tear-resistant or adhesive label being either the official label or a label provided by the supplier, or printed on ~~units of presentation~~ **each container**. This information may also appear inside ~~the unit of presentation~~ **each container**.

Adopted 1963 as European Standard No. 19
Revised 1982, 1994, 1998, 2000, 2001, 2002, 2003, 2004

ANNEX I

**MINIMUM CONDITIONS TO BE SATISFIED
IN THE PRODUCTION OF PRE-BASIC TC SEED POTATOES**

1. The parent material must be true to type for the variety.
2. These seed potatoes must be produced from officially certified initial stock, which shall be free from, at least, the following pests:
 - Potato Spindle Tuber Viroid
 - Clavibacter michiganensis* spp. *sepedonicus* (ring rot)
 - Ralstonia solanacearum* (brown rot)
 - Erwinia* spp.
 - Potato viruses X, Y, S, M and A
 - Potato Leafroll Virus
3. The facilities and procedures used for this production must be subject to official approval by the NDA. Measures must be applied to avoid contamination 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.
4. The growing medium should be pest-free.
5. All reasonable husbandry practices for the prevention or spread of pests and diseases must have been effectively carried out.
6. The growing crop must have been kept free from *Synchytrium endobioticum* (Schilb) Perc., potato viruses, bacterial diseases and from deviations of variety and type.

The satisfaction of these conditions and the tolerances prescribed for this class in Annexes II, III and IV shall be established by official inspection and/or testing.

The satisfaction of the conditions under item 2 shall be established by appropriate tests for those pathogens known to occur in the country.

Confirmation of variety purity or trueness-to-type may be dependent on inspection of the crop derived from the seed potatoes.

ANNEX II

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:
 - in crop for production of Pre-Basic TC class seed, 0 per cent;
 - in crop for production of Pre-Basic class seed, 0.1 per cent;
 - in crop for production of Basic I class seed, 0.4 per cent with no more than 0.2 per cent of plants showing severe virus disease
 - in crop for production of Basic II class seed, 0.8 per cent with no more than 0.4 per cent of plants showing severe virus disease³
 - in crop for production of Certified I class seed, 2 per cent with no more than 1 per cent of plants showing severe virus disease
 - in crop for production of Certified II class seed, 10 per cent virus disease with no more than 2 per cent of plants showing severe virus disease
4. The proportion of growing plants not true to the variety and plants of another variety should not exceed:
 - in crop for production of Pre-Basic TC class seed, 0 per cent
 - in crop for production of Pre-Basic class seed, 0.01 per cent
 - in crop for production of Basic category seed, 0.25 per cent
 - in crop for production of Certified category seed, 0.5 per cent.
5. The crop shall be free from:
 - (a) *Synchytrium endobioticum* (Schilb) Perc.
 - (b) *Clavibacter michiganensis* Spp. *sepedonicus* (Spieck. and Kotth.) Skapt. and Burkh.
 - (c) *Ralstonia solanacearum*

³ Reservation from the United Kingdom who at the moment do not apply such a strict tolerance.

- (d) Potato spindle tuber viroid and
 - (e) Tomato Stolbur
6. Depending on the circumstances and character of potato production in the country, there may be considered:
- (a) Requirements for isolation of the crop;
 - (b) Without prejudice to the requirements of Annex IV the establishment of tolerances for virus diseases and varietal purity.
7. The satisfaction of the above-mentioned standards or other conditions shall be established by official inspection and/or testing.
8. Depending on the circumstances and character of potato production in the country a programme of post-harvest testing for virus diseases may be considered.

ANNEX III

MINIMUM QUALITY CONDITIONS FOR LOTS OF SEED POTATOES

A. Tolerances for defects and disease allowed for seed potato tubers:

- | | | |
|-----|---|-----------------------------|
| 1. | Presence of earth and extraneous matter | |
| | -pre-basic TC | 1 per cent by weight |
| | -pre-basic | 1 per cent by weight |
| | -basic and certified | 2 per cent by weight |
| 2. | Dry and wet rot, where not caused by pests listed under B. | |
| | -pre-basic | 0 per cent by weight |
| | -pre-basic | 0.2 per cent by weight |
| | -basic and certified | 1 per cent by weight |
| 3. | External defects (e.g. misshapen or damaged tubers) | |
| | -pre-basic TC | 3 per cent by weight |
| | -pre-basic | 3 per cent by weight |
| | -basic and certified | 3 per cent by weight |
| 4a. | Common scab (<u>excluding netted scab</u>) ⁴ : 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) | 5 per cent by weight |
| | -basic and certified (> 33.3% surface cover) | 5 per cent by weight |
| 4b. | <u>Netted scab: Tubers affected over a specified per cent of their surface</u> | |
| | <u>-Pre-basic TC (0% surface cover)</u> | <u>0 per cent by weight</u> |
| | <u>-all other categories (>33.3% surface cover)</u> | <u>5 per cent by weight</u> |

⁴ *Reservation by Sweden: (> 33% surface cover) for common scab, (> 10% surface cover) for Rhizoctonia and 6 per cent by weight as total tolerance would be acceptable.*

5. Powdery scab⁵: Tubers affected over a specified per cent of their surface
- | | |
|--|----------------------|
| -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
- | | |
|--|----------------------|
| -pre-basic TC (0% surface cover) | 0 per cent by weight |
| -pre-basic (> 1% surface cover) ⁵ | 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.
- | | |
|-----------------------|------------------------|
| - pre-basic TC | 0 per cent by weight |
| - pre-basic | 0.5 per cent by weight |
| - basic and certified | 1 per cent by weight |

Total tolerance for items 2 to 7 :

-pre-basic TC	3 per cent by weight
-pre-basic	5 per cent by weight ⁵
-basic and certified	6 per cent by weight

- B.** 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, *Meloidogyne chitwood*, ~~and~~ *fallax* and *Ditylenchus destructor*.

⁵ *Reservations: Belgium, in favour of 0 per cent for pre-basic.*

Belgium and Romania need further consultations with the trade on tolerances for basic and certified.

Greece in favour of a 1% tolerance for basic and certified seed.

ANNEX IV

**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 mild or severe 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 2 per cent, with not more than 1 per cent showing severe virus disease, for Basic I class seed and 4 per cent, with not more than 2 per cent showing severe virus disease, 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 10 per cent, with not more than 5 per cent showing severe virus, for Certified I class seed and 10 per cent showing severe virus for Certified II class seed. Mild mosaic symptoms of discoloration and no leaf deformation should be ignored in categorizing virus for Certified II class seed.

4. 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 UN/ECE Standard for Seed Potatoes.

5. The incidence of virus in the direct progeny may be determined by either inspection and/or testing of tubers or plants derived from a sample of tubers from the crop ~~for virus~~. Annex X describes the principles of developing a sampling regime for this purpose.

Annex V

LABEL

A. Required particulars

1. Nature of the contents: "**Seed potatoes**"
2. The national designated authority (NDA) or its recognized initials
3. Country and/or region of production
4. Reference number of the lot, including where appropriate the producer's identification number
5. Month and year of closing
6. Variety
7. Category and Class and, where appropriate, record of field generation
8. Size
9. Declared net weight

B. Minimum dimensions

110 X 67 mm.

Annex VI**ORGANIZING THE INSPECTION OF CROPS GROWN FROM
SAMPLE LOTS OF SEED POTATOES**

(certified according to the standard)

I. PURPOSE OF THE INSPECTION

The examination of seed potatoes in crop tests enables the quality (vigour, purity, healthiness, productivity) of home-grown and imported lots put on the market to be checked at random.

II. ORGANIZATION**1. *Place of sampling***

Depending on the mode of transport (road, rail or waterway), the sample should preferably be taken when the lot arrives at its destination.

2. *Organs responsible for the sampling*

The sampling shall be done by the NDA.

3. *Sampling*

(a) The lot as defined in annex VIII is the unit represented by a sample. If the lot is a large one, the number of samples shall be increased to :

- One sample per wagon or vehicle, in the case of transport by rail or road;
- One sample for every 50 tonnes, in the case of transport by ship.

(b) A sample consists of 110 tubers, taken from different places in the container or from at least 10 sacks.

(c) The sample shall be placed in a sealed sack; its label shall bear the number of the wagon or the name of the ship, in addition to the information mentioned in annex VI.

4. *Preservation of samples*

Samples shall be preserved in a uniform manner in favourable conditions.

5. *Trial fields*

(a) The land must be suitable for potato growing.

- (b) Planting should be done in plots of 100 plants. The plots should be grouped by variety in order to facilitate comparison.
- (c) Manuring must be adapted to the needs of the crop, but moderate; the use of nitrogen during growth should be prohibited.
- (d) The usual cultural care must be conducive to keeping the field clean and the foliage intact.

6. ***List of plots***

A nomenclature of all the samples planted in the same field with the number of the plot concerned shall be sent to the organs responsible for evaluating them.

7. ***Evaluation of the crop inspection***

In order to be accurate, the evaluation shall in principle be carried out in two stages, with an interval of 10-15 days between them. Primary virus infections should not be taken into consideration.

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 *Erwinia carotovora* subsp. *atroseptica*. Similar symptoms may, however, be caused by *E. carotovora* subsp. *carotovora* and *E. chrysantemi*.

Certification:

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

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.

Contaminated field:

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

Disease:

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

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.

Generation number

The generation number is defined by the number of growing cycles since the first introduction in the field after micro-propagation or selection.

Homogeneous:

Uniform in composition and appearance.

Initial Stock

The initial pathogen tested microplants produced and maintained under an official control programme.

Inspection:

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

Lot:

A quantity of seed potatoes bearing the same reference number, which has been prepared for marketing and being of the same variety, category, class, size and origin.

Mild virus diseases manifest themselves only through by leaf discolorations or mottle (mild mosaic) and may not be easily discernible by visual inspection. The following viruses are usually the causes of mild virus diseases: PVX or PVS.

National Designated Authority (NDA):

Organization(s), agency or agencies designated and empowered by national legislation to administer the certification of seed potatoes under the Standard.

Origin:

Officially defined area where a lot of seed potatoes was grown.

Phytosanitary provisions:

Provisions in accordance with the International Plant Protection Convention.

Potato Leaf Roll:

Is a severe virus disease, causing plants to be usually smaller, sometimes stunted, than healthy plants. 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 NDA 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 endangered thereby 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 these plants with an economically unacceptable impact and which is therefore regulated with the territory of the importing part.

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 Potatoes:

Tubers which are certified by the NDA as meeting specified requirements and being suitable for reproduction.

Severe Mosaic:

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

Severe virus diseases manifest themselves through by deformations of the foliage with or without discolorations. Symptoms can be rugosity, crinkle, rolling and brittleness of the leaves or dwarfing of plant, as with the severe mosaic or and the leaf roll disease.

The following viruses or virus combinations are usually the origin of severe virus diseases:

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

Sprout inhibitor:

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 or absence of a pathogenic agent or varietal identification.

Traceability:

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

**ANNEX VIII:
Assessment Key for percentage tuber surface area coverage**

Common Scab

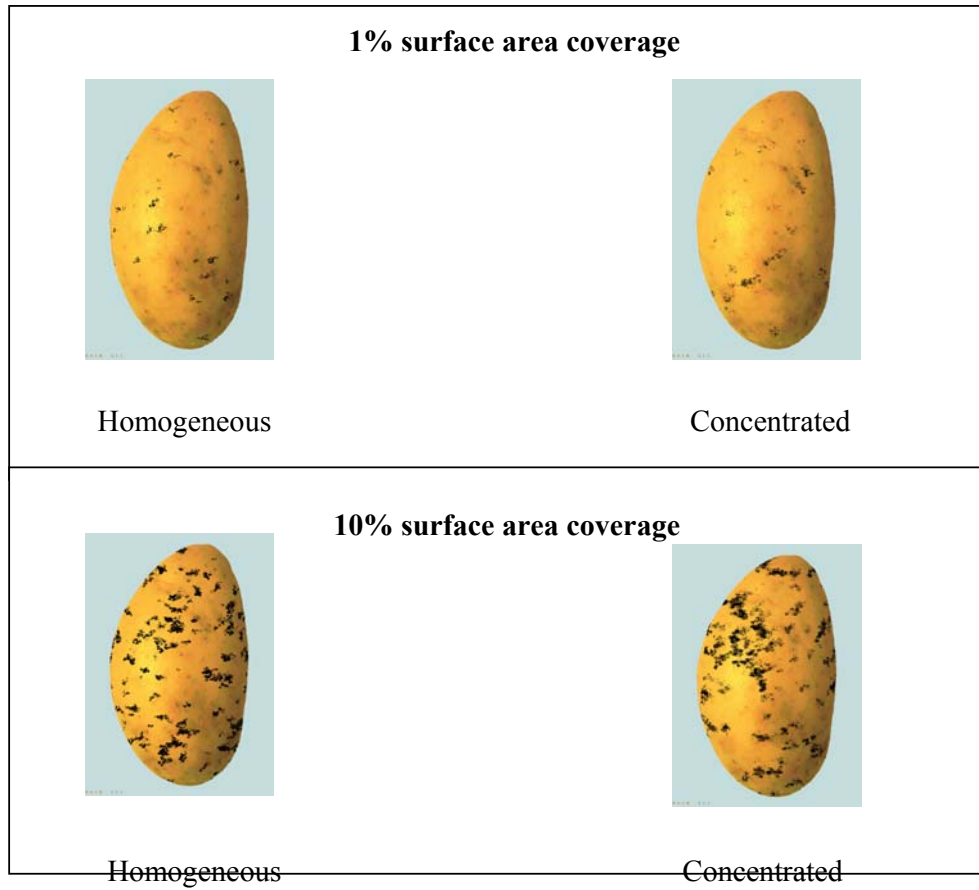
10 % surface area coverage



33 % surface area coverage



Rhizoctonia



Annex IX

SAMPLING tubers for VIRUS testing

Introduction

In testing seed stocks for the incidence of virus, it is seldom feasible to test the entire stock, so a test is done on a sample from the stock. Ideally, only seed stocks with infection levels below the tolerance would be accepted and those above the tolerance rejected. However, taking a sample from a stock means that only an estimation of the actual incidence of virus can be made.

The reliability of this estimation will vary with the size of the sample, relative to the size of the lot, and the population standard which is set for the test. Defining an acceptable population standard for any sample entails two types of risk.

The first is that of rejecting a stock containing less virus than the tolerance and is often described as the grower's risk. The risk of accepting a stock containing more virus than the tolerance is known as the buyer's risk. From the point of view of classification authorities, this could also be described as the risk of passing a stock which fails to meet the official tolerances.

Such testing makes a number of important assumptions, which are, primarily, that the infected tubers are distributed homogeneously in the stock and that tubers are sampled randomly. In addition, the choice of the size of sample to be tested will need to be balanced by other practical factors such as cost, available facilities, labour, logistics of handling samples, seed stock size, etc.

The following tables and graphs illustrate some of the principles involved in sampling tubers for testing for virus.

Confidence limits

Testing different samples from the same seed stock will give a range of results which, statistically, will lie within a specific interval with a certain percentage confidence. This interval is known as the confidence interval.

The acceptable level of confidence or probability should be decided before the testing is conducted but 95% confidence/probability is normally used. The accuracy of the estimation can be improved by increasing the sample size and by adjusting the allowable number of infected tubers in the sample, i.e. the sample tolerance (Table 1).

For example, the size of the confidence interval for a sample tolerance of 4% (4 allowable tubers) is 8.8% based on a sample of 100 tubers but, on a sample of 200 tubers, the interval decreases to 6% i.e. 7.7-1.7. The effect on the confidence interval of increasing the sample size does, however, become smaller at the larger sample sizes. Increasing the sample size from 100 to 200 tubers improves the accuracy of the estimation by 32 %, i.e. confidence interval reduced from 8.8 to 6.0%, whereas increasing the sample size from 300 to 400 tubers only gives an improvement of 15%.

In practice, therefore, the benefits of increasing the sample size have to be weighed up against the additional cost of the testing. The accuracy of the estimation can also be affected by changing the allowable number of infected tubers in the sample (table 1). For example, by decreasing the number of allowable tubers from 4 to 3, i.e. changing sample tolerance from 4 to 3 %, the confidence interval is decreased from 8.8 to 7.9 % and the confidence limits themselves become lower. Decreasing the allowable number of infected tubers in the sample also has a significant effect on the probability of classifying at higher tolerances than those allowed in the sample as illustrated in the next paragraph.

Table 1: Confidence limits, at a probability of 95%, for various sample tolerances of virus in relation to the size of the sample.

Tolerance(%) for virus in a seed stock	Size of sample	Allowable No of infected tubers	Confidence limits	
			Lower	Upper
4	100	4(3)	1.1(0.6)	9.9(8.5)
	200	8(7)	1.7(1.4)	7.7(7.1)
	300	12(11)	2.1(1.8)	6.9(6.5)
	400	16(15)	2.3(2.1)	6.4(6.1)
10	100	10(8)	4.9(3.5)	17.6(15.2)
	200	20(18)	6.2(5.4)	15.0(14.0)
	300	30	6.9	13.8
	400	40	7.2	13.4

Probability of classifying stocks to meet specified tolerances

From the confidence intervals, it can be seen that classifying stocks based on a sample will contain a risk that some stocks, which fail a test, do, in fact, meet the tolerance and others, which pass, should fail. Table 2 and Figure 1 show the effect of varying sample size and the number of virus infected tubers allowed in the sample on the probability of classifying seed stocks with different incidences of virus infection. For example, in a test on a sample of 100 tubers where 3 virus infected tubers were allowed, there would be a 14% chance of classifying a stock containing 6% virus as meeting a tolerance of 4%.

Table 2: Probability of classifying seed stocks at two tolerances for virus based on a laboratory test in relation to the size of sample and the allowable number of virus-infected tubers in the sample:

Tolerance (%) for virus in a seed stock	Size of sample	Allowable no of infected tubers	Probability of acceptance or classification						
			% infected tubers in stock						
			0.5	1	2	4	6	8	10
4	100	3	100	98	86	43	14	4	1
	200	7	100	100	95	45	8	1	0
	300	11	100	100	98	46	5	0	0
	400	15	100	100	99	46	3	0	0
10	100	8	100	100	100	98	85	59	32
	200	18	100	100	100	100	97	75	37
	300	30	100	100	100	100	100	91	55
	400	40	100	100	100	100	100	94	54

NOTE: The allowable number of tubers is, often, set at a lower level than the overall seed stock tolerance of 4 and 10% respectively, particularly in the case of a relatively small sample size. By lowering the tolerance in a sample the >buyers risk= is reduced.

Figure 1: Probability of classifying seed stocks with different incidences of virus as meeting a tolerance of 4% or 10% for virus in a laboratory test in relation to the size of sample and the allowable number of virus infected tubers in the sample.

tolerance up to 4%

tolerance up to 10%

Figure 1a
BASIC SEED (4%)
 Probability of classification

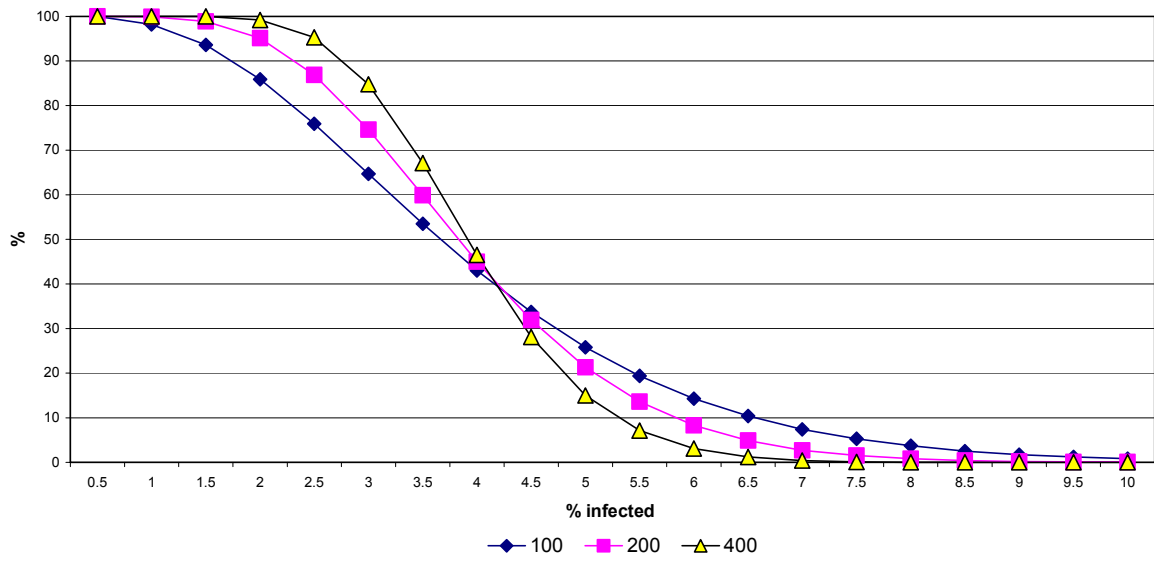
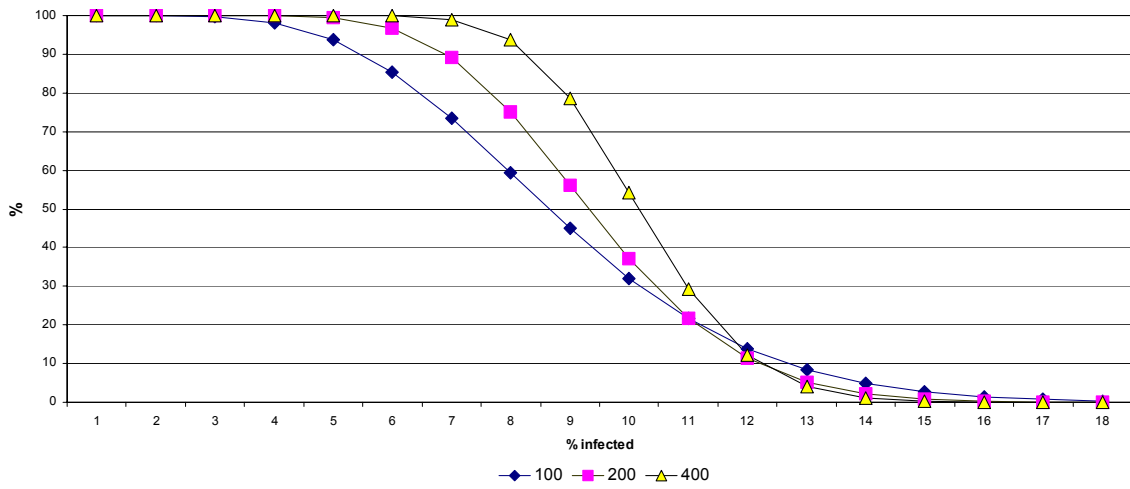


Figure 1b
CERTIFIED SEED(10%)
 Probability of classification



ANNEX X: UNECE STANDARD FOR SEED POTATOES (SUMMARY OF TOLERANCES)						
	PRE-BASIC TC	PRE-BASIC	BASIC CLASS I	BASIC CLASS II	CERTIFIED CLASS I	CERTIFIED CLASS II
1. CROP TOLERANCES						
Globodera rostochiensis (soil tolerance)	0	0	0	0	0	0
Globodera pallida (soil tolerances)	0	0	0	0	0	0
Black leg (%)	0	0	0,5	1	1,5	2
Synchytrium endobioticum	0	0	0	0	0	0
Clavibacter michiganensis	0	0	0	0	0	0
Ralstonia solanacearum	0	0	0	0	0	0
Potato spindle tuber viroid	0	0	0	0	0	0
Tomato stolbur	0	0	0	0	0	0
Virus tolerance	0	0,1	0,4 (0,2 severe)	0,8 (0,4 severe)	2 (1 severe)	10 (2 severe)
Other varieties & off types	0	0,01	0,25	0,25	0,5	0,5
2. LOT TOLERANCES						
Earth & extraneous matter (%)	1	1	2	2	2	2
Dry & wet rot (not caused by synchytrium e. Clavibacter m. Ralstonia s.) (%)	0	0,2	1	1	1	1
External defects	3	3	3	3	3	3
Shrivelled tubers	0	0,5	1	1	1	1
Common scab	0	5 (10)*	5 (33,3) *	5 (33,3) *	5 (33,3) *	5 (33,3) *
<u>Netted scab</u>	0	5 (33,3) *	5 (33,3) *	5 (33,3) *	5 (33,3) *	5 (33,3) *
Powdery scab	0	1 (10) *	3 (10) *	3 (10) *	3 (10) *	3 (10) *
Black scurf	0	1 (1) *	5 (10) *	5 (10) *	5 (10) *	5 (10) *
Total tolerances (%)	3	5	6	6	6	6
Globodera rostochiensis	0	0	0	0	0	0
Globodera pallida	0	0	0	0	0	0
Synchytrium endobioticum	0	0	0	0	0	0
Clavibacter michiganensis	0	0	0	0	0	0
Potato spindle tuber viroid	0	0	0	0	0	0
Tomato stolbur	0	0	0	0	0	0
Meloidogyne chitwoodi and fallax	0	0	0	0	0	0
<u>Dytlinchus destructor</u>	0	0	0	0	0	0
3. DIRECT PROGENY TOLERANCES						
Other varieties & off types	0	0,01	0,25	0,25	0,5	0,5
Virus (%)	0	0,5	2 (1 severe)	4 (2 severe)	10 (5 severe)	10

The figure in brackets is the allowable % surface area covered: a tuber is deemed to be affected by the disease only if surface area affected exceeds the specified allowable surface tolerance